The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Brunner-Mond Jubilee

ADMIRABLY as Sir Alfred Mond summarised, in the course of the jubilee celebrations at Winnington last week, the causes which explain the wonderful success of Brunner, Mond and Co., the real secret can never be fully defined in words. It lies in the personality of the two men who fifty years ago joined forces, and who made a success of this venture, as they would probably have made a success of anything. The greatest tribute to the concern is the inarticulate tribute of the concern itself. It stands a monument to itself. Yet it is worth while recalling some of the features associated with so remarkable an achievement. Not the least notable is the loyalty which the firm has inspired in its employees. Mrs. Roscoe Brunner could hardly have had a pleasanter task than that of presenting gold medals to a large number who had completed forty years or more in the service of the company, following upon the previous presentation of silver watches to men of twenty-five years' service and of gold watches to those of thirty-five or more. These long periods testify to a real leadership and understanding of men, and to qualities of character which attract and retain confidence. The firm has taken a pride in the staff and the staff a pride in the firm, and the hearty team work which has resulted is one of the primary causes of success. But in addition to this and to the excellence of the commercial organisation and the scientific service, there was, above all, the first vision on the part of the founders of the great opportunities presented by the natural salt deposits of Cheshire, and the capacity to utilise these natural advantages in the right way. And, were they still alive, very high among the satisfactions of the two founders would be the thought that in each case their personal qualities and the traditions they created are continued in their successors.

The story of the enterprise on which John Brunner and Ludwig Mond entered fifty years ago would be a long one if told in detail, and from many aspects would be worth study. It can only be touched very briefly here. Solvay's ammonia soda process, which the company was formed to work, was a simpler and cheaper method of making soda than the older Le Blanc process, which it threatened. It was originally patented by two British chemists, Dyer and Hemming, but Solvay brought it into practical working, and it was as the result of a visit of inspection paid by Dr. Ludwig Mond to the Solvay works at Couillet that the rights for working the process in the United Kingdom were secured. More recently came the electrolytic process, originated on the Continent but developed by the Castner-Keller Alkali Co., while a rival process was worked by the Electro-Bleach and By-products Co. Both these concerns were merged in Brunner, Mond and Co. in 1920. The latest enterprise is the manufacture of synthetic ammonia, which, though details are not disclosed, is understood to be making good progress. To-day the company is looking back with justifiable pride on its past achievements. But its future lies in fresh developments, and these fortunately promise successes not less notable than those already to its credit.

Dr. Armstrong's Address

THE presidential address which Dr. E. F. Armstrong delivered at the annual meeting of the Society of Chemical Industry on Thursday at Cambridge was in the first degree the utterance of a distinguished man of science. But it was more than that. It represented a knowledge and love of science, tempered or supplemented by a wide knowledge of the world, of industrial and commercial conditions, and of the productive part science can be made to play in industry. It was concerned more with realities than with doctrines, and its sound practical sense supplied an element too often lacking in such discourses. It is not less pure science that Dr. Armstrong stands for, but its fuller employment and application in the service of the world.

The plea with which the address closed, for a wide confederation of existing chemical organisations, carries that problem a stage forward and suggests the lines of

a general policy. The immediate proposal is that the councils of all the societies should examine the question next session and consider the propriety of asking the Federal Council to form a committee to study forthwith the desirability and practicability of federating the chemical societies. This is all in keeping with the modern tendency towards the combination of allied interests, and theoretically, we imagine, it will be generally approved. It is wise to recognise, however, that a long time may elapse before the vision is realised. It would be easy, probably, now to arrange for such a confederation on paper, but paper organisations are of little value. A real and operative confederation of chemical interests can only come as the result of a real desire for it among all the constituent bodies, and a long period of education may be required to bring this into existence. At present each body is rather inclined to think of itself as all-sufficient, and to regard its own independence as a point of honour. Gradually, they may all be educated out of this exclusive attitude, and into a larger co-operative spirit. The good point about Dr. Armstrong's plea is that it proposes a definite start. Fifty years hence, when London has its chemical headquarters and the Society holds its annual meeting in them, the President of that day may be found quoting Dr. Armstrong's address as the starting point of the movement, just as we are looking back to-day on the potent results of the partnership which two young men named Brunner and Mond formed half a century ago.

There are many other points in the address worth notice—the importance of research in the true sense, the right sort of training for chemists, the duty of manufacturers to treat science as an essential part of their equipment, and the importance of interpreting chemistry to the public in terms that can be understood. The last point we have ventured to emphasise repeatedly, and Dr. Armstrong describes the situation in terms as plain as any used by ourselves. Chemists, he states, as a class are apt to overlook that whilst their science is the most practical of all, it has a jargon even more difficult to the layman than that used in the biological sciences, and he urges approaching the public in "a plain, honest language" they can understand. "It is possible," as he truly says, "to meet people of intelligence ready to discuss practically any subject of everyday importance except chemistry. They have at best but a vague idea of the analyst, and no conception of constructive and creative chemistry." But while Dr. Armstrong and others lament this lack of contact between the laboratory and the public, very little is being done to teach young chemists that there is a world outside the laboratory of which they must take account. On the contrary, they see in most of their societies an obstinate insistence on living to themselves, and a resentment against outside inquiry as to their work. The entire attitude and spirit on this point calls for reversal.

Tests for Carbon Monoxide

THE U.S.A. Bureau of Mines, which has been investigating tests for the detection of carbon monoxide, claims to have discovered a method by which it is possible to ascertain within three minutes the extent to which a person has been affected by carbon monoxide gas through the extent of poison saturation in the blood. Formerly it took approximately from 24 to 48 hours before diagnosis could be made of such cases, either in hospitals or well-equipped laboratories, with the services of a skilled organic chemist. The test is effected through a simple and inexpensive instrument which may be carried in the pocket and which requires no special training for its operation. With its usual concern for the wide publication of research results, the Bureau has already communicated particulars of its discovery to 700 industrial physicians and surgeons, and it is expected that the new method will shortly be in general use in coal mines, gasworks, and other places where risks of poisoning are present.

Quality Certificates for Coal

THERE is an ominous movement on foot in America which both buyers and sellers of coal in this country will do well to watch. In many quarters it has for long been considered that the somewhat casual way in which large industrial consumers purchase their coal must prove decidedly inimical to their interests, and it may almost be said that in this respect we display a naiveté which scarcely characterises our other business dealings. When we are purchasing chemical products in bulk we usually protect ourselves by ensuring that the price is a *pro rata* one depending upon the purity of the product as delivered. With coal, however, we are content to rely upon the reputation of some particular mine, and from extended experience we have come to believe that a coal which bears a name which is familiar will give us the results we require. We do not, in fact, stop to inquire whether the old reputable seams may have changed in character, or whether the methods adopted at the pit may have undergone modification which has changed the character of the coal. During the war we came up against some unfortunate experiences which illustrated how even our best grades of coal can deteriorate, and this once more raised the question of the purchaser protecting himself by the inclusion in his contract of a clause which would indemnify him in the event of quality falling below some agreed standard.

Suggestions have frequently been made that calorific power should form a basis on which to adjust the value of coal. Thus, a certain price per ton would be charged for a definite calorific power, and a *pro rata* reduction made when the heating value fell below the standard. For those who employ coal as a fuel the system has many advantages. On the other hand, if the coal is destined for carbonisation, such a basis would be of no great value. That we are moving in some such direction of certification of quality is, however, indicated by the fact that a conference is now taking place in the United States between railway representatives, colliery owners, and the Bureau of Mines, for the purpose of working out the details of a plan for certifying the quality of export coal. The latest information discloses that a scheme has been evolved by means of which each carload of coal shipped from American mines for export can be certified as to the producing mine, the seam from which it is taken, the date shipped, and other details guaranteeing to the foreign buyer the quality of the coal he ordered. Those associated with the coal industry in America believe that the certification of export coal will enable the country to retain some

of the hold on foreign markets which has been gained by the results of the French occupation of the Ruhr. If foreign coal buyers can be assured that they will receive the quality of fuel they desire, it is contended they will continue to buy coal from the United States. At any rate, a precedent will be created which cannot be altogether ignored by the colliery undertakings in this country.

Colour Users and Dyestuffs

THE annual report of the Colour Users' Association and the speech by Mr. Sutcliffe Smith at the annual meeting constitute a searching review of the dyestuffs situation in this country, from the colour users' point of view. There are several satisfactory features, especially the constant consultation that has been going on between the Association and the Licensing and Development Committees, the Board of Trade, and the British makers, for it is only by such co-operation that the difficulties can be overcome. On the other hand, there are still some very troublesome problems to be solved, among which that of price is one of the most important. According to Mr. Sutcliffe Smith's address, the users are paying from 300 to 400 per cent. above the pre-war prices for their dyestuffs, while they contend that 200 per cent. above the pre-war figure would be reasonable. Their complaint is that the cost of establishing the dyestuff industry in this country is being borne by the users. The makers, on the other hand, are obviously not exploiting the position for the making of excessive profits, and they describe themselves as unable to get down to a maximum selling price of three times the pre-war level. There is in the colour users' attitude no hostility to the British industry and no question as to the importance of establishing it; their desire for cheaper dyes is natural, and their suggestion is that if the British maker cannot meet the user's request for lower prices without financial assistance a grant in aid should be made by the Government. One satisfactory point is that very little is now heard about the quality of British-made dyestuffs, while the output is remarkably good for so comparatively short a period. The fact that the difficulty is now largely resolved into one of price shows, in fact, the progress we have made, and that difficulty can be surmounted, as others have been, by a co-operative effort.

Strike Effects in Belgium

A REPRESENTATIVE of THE CHEMICAL AGE who has recently returned from Belgium brings back some regrettable information as to the dislocation which occurred in practically all industrial circles in that country as a result of the action taken by the National Syndicate in launching a strike among the railway, telegraph, and postal workers. A somewhat remarkable feature of the strike was its direct aim at industry, which is indicated by the fact that its organisers were particularly careful to ensure that ordinary passenger traffic on the railways was not interfered with. Everywhere our representative went, however, he encountered the same expression of disappointment at the fact that the country's staple industries (particularly iron and steel manufacture, which, with a number of promising orders on hand, was just beginning to recover some of its prosperity after the recent slump years) were again getting dangerously near a catastrophe. Some producers estimated that although the stoppage was of only a few weeks' duration it had been sufficient to absorb their profits for the whole year. Charleroi and its neighbourhood has, of course, been the main centre to suffer, and it was found necessary to close down about a dozen glass furnaces, while at the dye works at Verviers operations were having to be similarly curtailed. Fortunately the organisers of the strike realised that they were beaten, and the men returned to work without practically any modification of their former wages and hours.

Points from Our News Pages

Dr. E. F. Armstrong, in his presidential address to the Society of Chemical Industry, discusses the relations between Chemistry and Industry (p. 666).

The hearing of the complaint before the Official Referee that formaldehyde is improperly included for import duty under the Safeguarding of Industries Act was opened on Friday, June 15 (p. 669).

At the annual meeting of the Colour Users' Association the Chairman (Mr. Sutcliffe Smith) reviewed the dyestuffs situation (p. 670).

At the Mining Exhibition on Thursday, June 14, papers were presented by Mr. E. I. Lewis on "Fine Chemicals in Industry" (p. 671) and by M. Mennecke on "The French Potash Industry" (672).

A greater volume of business is indicated in our London Market Report, with brisk export inquiry (p. 679).

Our Scottish Market Report describes business as quiet during the week, with nothing of importance to record (p. 682).

Books Received

THE CHEMISTRY OF LEATHER MANUFACTURE. By John Arthur Wilson. New York: The Chemical Catalog Co., Inc. Pp. 342. $5.00.

THE CONNECTIVE FACTORS OF MATTER AND ELECTRICITY—A SUMMARY. By E. Ford Morris. Pp. 12.

THE CAUSES AND PREVENTION OF CORROSION. By Alan A. Pollitt. London: Benn Brothers, Ltd. Pp. 230. 25s.

METALS AND METALLIC COMPOUNDS. Vol. III.—THE TRANSITION ELEMENTS. By Ulick R. Evans. London: Edward Arnold and Co. Pp. 270. 14s.

METALS AND METALLIC COMPOUNDS. Vol. IV.—METALS OF THE "B" GROUPS. By Ulick R. Evans. London: Edward Arnold and Co. Pp. 350. 18s.

The Calendar

June 25	Institution of Rubber Industry (London Section): "Some American Rubber Manufacturing Problems." Dr. W. C. Geer. 8 p.m.	Engineers' Club, Coventry Street, W.
28	Royal Society: "The Titration of Amino- and Carboxyl-Groups in Amino-Acids, Polypeptides, etc.," by L. F. Harris (communicated by Professor F. G. Hopkins). 4.30 p.m.	Burlington House, Piccadilly, W.1.
29	Brunner, Mond and Co., Ltd.: Dinner to Celebrate the Fiftieth Anniversary of the founding of Winnington Works. 8 p.m.	The Hotel Victoria, Northumberland Avenue, London.
July 5	College of Technology, Manchester: Celebration of the Coming-of-age of the College Building. Conversazione at 7 p.m.	College of Technology, Manchester.

Chemistry & Industry: Dr. E. F. Armstrong's Address

At Cambridge, on Thursday, Dr. E. F. Armstrong, President of the Society of Chemical Industry, delivered his presidential address, taking as his subject "Chemistry and Industry." A summary of the address appears below, and the reports of the further proceedings will appear in our next issue.

DR. ARMSTRONG, in the course of his presidential address on "Chemistry and Industry," said that industry could not afford to neglect chemical science and its teachings. The future of industry largely depended on the application of scientific principles to production, and chemists should be exceptionally competent to advise on such matters. The progressive manufacturer of to-day realised the need of the co-operation of the scientifically trained man, and it remained for the chemist to fit himself by his training and experience to give the assistance required. No one should enter the chemical profession unless he felt a definite call to do so. Secondly, the life of the chemist was one of investigation; he must always be asking questions as to the why and the wherefore, and must therefore possess in the highest degree the spirit of initiative, of research. His training must have been primarily in the methods of research, of original investigation; in no other way was it possible to cultivate those faculties which he would daily be called upon to exercise. Chemical schools must be pervaded by an atmosphere of research; the proper spirit of inquisitiveness must be awakened and maintained in them until it became a habit. Such an atmosphere was effective above all else in bringing out individuality and self-reliance by fostering enthusiasm for one's work. If the colleges failed to provide the right type of men, then the manufacturer would have just cause for complaint. It was the exceptional man who was worth training; it was he who moved the world.

Dr. E. F. Armstrong.

Facilities for Training

It being granted that the right type of man was available—and the more they could attract the highest social classes the better—and that the early training and spirit at the colleges were satisfactory, it remained to inquire as to the facilities for the final post-graduate training which was all essential to the chemist who hoped to take a high place in industry. Laboratories had during the past few years been greatly overcrowded and the staff overworked, but many extensions were in progress and the pressure of students was likely to lessen in the near future: there was a widely-reported shortage of equipment and of funds for laboratory work which should be noted by manufacturers and others able to make donations to the cause of science. For post-graduates numerous scholarships and fellowships were now available, and the research funds of the Chemical Society and other societies provided assistance in the purchase of equipment and materials. At the time of the foundation of the Society in 1881 the facilities for obtaining a training in chemistry and physics were very limited, and it was very difficult for a young man desirous of receiving an extended training to obtain financial aid. During the next twenty years excellent facilities were created on all sides, in particular the Finsbury Technical College, the Central Technical College, and, later, the London university colleges and the provincial universities. The existence of scholarships enabled many students to enjoy a training at those institutions which would otherwise have been denied to them, but at the end of their college and university courses only a very limited few were able to take advantage of that further course of training, often at a foreign university, which was required to fit a chemist to undertake research work and to qualify him for the higher posts in industry.

Professors, in the closing years of the nineteenth century, frequently emphasised the need of research fellowships to enable an increasing number of graduates to stay on for the fourth, fifth and sixth years at college for training as research workers. Many such fellowships were founded by the generosity of the city livery companies during the 'nineties, notably the Salters' Company and the Leathersellers' Company; many of these fellows entered industry, and their record, although barely twenty-five years since the first of them left college, was already a very satisfactory one. The memorial to their former President, Sir William Ramsay, had also, in part, taken the form of the endowment of research fellowships, and the more recent scheme devised by the Salters' Company, and known as the Salters' Institute, was also based on a system of research fellows. Mention must also be made of the numerous grants to individual research workers made by the Department of Industrial and Scientific Research.

To-day they were far from lacking facilities for training the research worker and affording financial aid during the period of training. Indeed, the thought arose whether entry to the profession was not being made too easy at this stage, though it might be urged that this created the element of competition which alone could stimulate imperfect man to his best efforts.

The Chemist in Industry

As regards those entering industry, the time was ripe for a conference with the teachers and a broad exchange of view either in public or in private where frank speaking could be the order of the day. Manufacturers found it very difficult to get the type of man they required. Possibly the Society could organise such a conference, and he had in mind the utility of a somewhat similar meeting with Professor Meldola in the chair, held under the auspices of the Institute. His remarks must not be held to place the blame on the teachers; perhaps the material they had to work on was unsuitable. Research in industry, above all in the chemical industry, was no new thing; it was perhaps a little older than the industry itself, as the man who started the latter was certainly an original investigator.

Progressive firms had always had research departments, even though they had not publicly advertised the fact to the same extent as the German dye industry. Much, however, of the work had been more in the nature of the investigation of factory processes, mishaps, and troubles, or the seeking of new applications for the firms' products and by-products. Only a limited number of companies had installed separate research departments with a large and independent staff working on a definite plan over a period of years. Naturally it was only the largest corporations that could undertake such a responsibility, and it was our national characteristic to prefer to manufacture in smaller units than those of the large corporations on the continents of Europe and America. Furthermore, until recently there was no surplus of skilled research workers.

As a result of the lessons learnt during the war, all this was now to be changed: scientific and industrial research in this country had during the last few years received direct and very definite State encouragement under the auspices of a Committee of the Privy Council, a new Department of Scientific and Industrial Research having been created for the purpose, with Sir William McCormick as chairman and Sir Frank Heath as secretary. Perhaps the most interesting venture of this department had been the setting up of industrial research associations, of which twenty-two were in active operation, and two others had received licences from the Board of Trade.

Broadly speaking, such research institutions were not intended for the largest firms able to organise and finance research laboratories of their own, but should be most useful to a combination of smaller firms, who in the past had not only been unable to incur the expenditure of a research department but had even been unwilling to contribute sums equivalent to no more than the yearly wage of an additional workman or foreman for the purpose of scientific investigation. Whether or no immediate results proved of practical value to the individual firms, it should become a point of honour with them to maintain a research institute within their industry.

Industry and Research

The object of industry was definitely financial; the object of industrial research was to work out new processes or improve existing ones. Investigations which had for their object the solution of special difficulties of particular processes and the utilisation of waste materials were not researches in the true sense of the word, although the solution of such problems would be to the financial advantage of the industry. These were matters more for the particular firm than for a research association. Naturally, the scheme of the Department for Scientific and Industrial Research had not escaped criticism, but they should suspend judgment until all the associations had had at least five years' experience, realising that the development of scientific research in twenty-four of our leading industries, and the interest taken by the manufacturers themselves in this work, could not fail to be of far-reaching importance to our future as a manufacturing nation. The scientific workers on the staff of the research associations must justify by their diligence the confidence placed in them.

Any assemblage of men of science willing to face the facts would agree that science, scientific method, and scientific research had not yet won that position within the realm and its industries that was requisite to maintain our place among the nations. It was customary to attribute the blame to the other party and speak of the "neglect of science." Perhaps it was desirable to have occasionally what their American cousins called a heart to heart talk to ascertain whether all was well in their own camp.

During his year of office, in talking to the younger men in the sections, he had never failed to emphasise the fact that whilst they gained their first appointments on their qualifications as chemists they succeeded afterwards because of their ability as men. Knowledge might be power but not until it was applied to the service of humanity. Probably the keynote to success in this and the next generation lay in all that was connoted by the term "service." It would not be enough to make and to offer for sale, caring not for the ultimate fate of the article; rather must the manufacturer take an active part in instructing and advising the buyer. It was the early realisation of this fact, perhaps even more than any reputed technical superiority or cheapness of product, which formerly enabled the German dye industry to obtain its hold on the markets of the world.

Chemists must also be prepared to give service; above all, they must be practical. It could not be said too emphatically that the young chemist on leaving his university must have had such training as enabled him to be at least a chemist: in the first place, a competent analyst—for analysis was the very basis of the science—and, secondly, a competent manipulator in the laboratory, with real experience in handling organic substances. He seldom got an opportunity later in life to acquire this knowledge, whereas specialisation, which was mainly a question of application, came all too early to most of them. It was an admitted fact in industry to-day that far too many of the present graduates from the universities were weak on the purely chemical side; it was this experience that had caused him to urge that the prime duty of the university course should be to produce chemists and not "labelled chemists." From this point of view they as a profession should be proud to call themselves "chemists" and not add an apologetic descriptive prefix. It was the application of chemistry in agriculture and in engineering that was wanted, not agricultural chemists, and he had even had the temerity to quarrel with the term "chemical engineer," believing that there was no such person, though at the same time positive that the highest gift his fairy godmother could give to the chemist was a knowledge of and still more an inclination for engineering—an art, not a science. He regarded physics as a branch of chemistry; a thorough knowledge of physics and physical chemistry was part and parcel of the chemist's training from his first week at college, though he could not see why applied physical chemistry should be called "chemical engineering."

The Public Point of View

Chemists as a class were apt further to overlook that whilst their science was the most practical of all, being applied to every detail of everyday life, yet it had a jargon even more difficult to the layman than that used in the biological sciences. It was within their powers to alter this reproach, and whilst for their transactions it was convenient and proper to use the precise and wholly satisfactory terminology which was expressive of their knowledge, they must strive to approach the public using a plain honest language which they could understand. It was possible to meet people of intelligence ready to discuss practically any subject of everyday importance except chemistry. They had at best but a vague idea of the analyst and had no conception of constructive and creative chemistry.

The war gave chemists a chance they had never had before to bring their capabilities and achievements before the nation, and for a while they strutted in the limelight, both as destroyers and conservers of human life. But they were unprepared as a body, disloyal to the extent that they were not sufficiently proud of their profession and unable to take advantage of the opportunity; hardly any one of them was able and willing "to preach the gospel" as an American colleague put it "of the value and importance of chemistry to the past, present, and future progress of mankind and to preach it in terms which are acceptable and comprehensible to the layman." They had not established any central organisation among chemical societies responsible for this type of propaganda. Chemistry, if not more remote, was less obvious to the layman in its effects, though it obtruded just as much on his daily life as medicine or engineering. Chemists must lay more stress on the fact that they beautified the world, or, at least, the feminite part of it, with their dyestuffs, turned wood into silk stockings, made water potable, and rendered a thousand other like services to the community. It was an interesting fact that during the month of April the New York Section of the American Chemical Society arranged for five popular talks on chemical topics to be broadcast to people, described as radio fans. This was regarded as an important test of the popularisation of chemistry. It was to be hoped the London Section would make efforts to follow suit.

Confederation of Chemical Societies

After a reference to the recent celebration of the centenary of the United Alkali Co., and the jubilee of Brunner, Mond, and Co., and to the conditions which accounted for the success of those undertakings, Dr. Armstrong gave some interesting particulars of the early days of the soap industry, and concluded with a plea for greater co-operation among chemical organisations.

"We chemists," he said, "are excellently catered for by a number of organisations, each of which may be stated to fulfil a definite purpose, with the consequence that a large number of us belong to at least four societies and the majority of us to more than one. The result is that, as the societies expand, there is a great deal of overlapping, the total subscriptions fall heavily on the individual, and there is unnecessary expenditure, particularly on publications and on administration. On the other hand, as several names appear on more than one of the councils of our societies, there is already some measure of community of thought in their policies. An unfortunate result of the present state of things is that no one society can claim to speak for chemists as a whole; indeed, it repeatedly happens that two voices are heard when one would suffice.

"The attempt was made a few years ago to bring into being a body common to all the societies, and, accordingly, the Federal Council for Pure and Applied Chemistry was formed. Composed of delegates from a number of the societies, its functions are to initiate and co-ordinate effort and generally to advise in matters affecting all the societies—*i.e.*, chemists in general. Whilst a body so constituted can only act with diplomatic slowness, it has already much to its credit, in particular the initiation of the International gatherings, one of which has so felicitously preceded our own meeting. It has,

moreover, served as a model to other countries and to other sciences. We have in the Federal Council a nucleus or skeleton organisation to which can be entrusted the difficult task of forming one great chemical society and raising the necessary funds for our future home, the Chemical House. I would suggest that the time has come to make the definite proposal that it should become the agreed policy of some, if not all, our societies to take steps to bring about a gradual confederation.

"It would appear obligatory that I should submit a very crude draft outline of a scheme. Chemists and others interested in chemistry would become members in the first place of the Confederation, and in the second of a particular Society or Section. The government would be in the hands of a Grand Council chosen in part from the members and in part nominated by the sections; the actual work would be done by an executive elected from among the Grand Council. The administration would be in the hands of a general manager, assisted by sectional secretaries. A staff of editors would produce the publications. The existing societies under this scheme would be incorporated as a whole so as to retain in full the great asset of their 'goodwill,' but would have their activities more closely defined. Each society would continue to devote itself to the particular branch of the subject with which it had been associated in the past, but all overlapping would be entirely eliminated. The Institute would continue to act as an examining body and maintain a register of Fellows and Associates, who alone would be entitled to use the professional qualifications, F.I.C. and A.I.C.; the remainder would be simply members using no professional distinction. The unnecessary custom of using letters F.C.S., which have no meaning whatsoever as a qualification in the professional sense, would also disappear. The Institute would also watch over the important question of professional etiquette. Weighty committees would be established to deal with the Government departments and with public propaganda. It is not difficult to outline a fairly full and comprehensive scheme, but this is better done by a committee than by an individual. It will suffice, therefore, for me to make the proposal that the councils of all the societies proceed to examine the question next session and consider the propriety of asking the Federal Council to form a Committee to study forthwith the desirability and practicability of federating the Chemical Societies.

Professional Status

"A much more delicate question will then remain to be settled before the profession of chemistry can take rank with medicine or the law. Indeed, we have amongst ourselves to decide whether the word 'chemist' is to have as wide a meaning as the term 'engineer' or a restricted meaning like the term 'solicitor' or 'accountant.' The engineer may be at the very peak of the profession or occupy any other grade down to the skilled fitter. By 'solicitor' or 'accountant' a qualified man is understood. At present we cannot even lay claim to a monopoly in the application of the term 'chemist,' though I do not despair of educating the public on this point, but the outstanding feature is that the chemist may or may not be fully qualified. If we are ever to rank as a profession, then we must resolutely close our ranks to all but the qualified, possibly using the term 'chemical assistant' for the large number in works who will be unable to qualify through no fault of their own. But it is essential that all who practise chemistry, either as consultants, analysts, teachers, or in any other public capacity, are qualified. The Institute of Chemistry, now that it has filled its ranks and is really representative of the profession, should devote all its influence and resources to attain this end. The harm and the mischief which are being done to-day by unqualified and incompetent—the two words are generally though not necessarily synonymous—persons who style themselves 'chemists' is very considerable, far greater than most of us realise.

"You, who include manufacturers, teachers, engineers, consultants, works chemists and other research chemists, form the most powerful organisation for whose help we appeal. The provision of a large fund is of prime importance and the members of this Society will, I know, do their utmost, not only for the sake of the science in which we are interested, but out of a sense of pride in the Society which we have founded and to which we are so attached. It is our duty to set an example, and I have every confidence that we shall do so.

Chemical Trade Returns for May

As briefly noted in our issue last week (page 641), the official trade returns for May show satisfactory figures. The value of chemicals, dyes and drugs imported was £1,118,578, which represents a slight decrease of £68,888 on the April figure, but an increase of £249,415 on May, 1922. Exports under the same heading are valued at £2,572,955, showing increases of £521,472 and £824,854 over the figures for April, 1923, and May, 1922, respectively. Examination of the detailed figures as to quantities given below shows notable increases in the imports of calcium carbide, sodium compounds and coal tar intermediates. The majority of products show a satisfactory increase in exports compared with last year, particularly sulphuric acid, sulphate of ammonia, coal tar products generally, and synthetic dyestuffs.

Imports for May

INCREASES.

		1923.	1922.
Acid, acetic	tons	717	278
Acid, tartaric (including tartrates)	cwts.	3,428	2,936
Bleaching materials	cwts.	1,113	967
Borax	cwts.	5,009	3,240
Calcium carbide	cwts.	41,301	15,440
Nickel oxide	cwts.	4,401	—
Sodium nitrate	cwts.	138,867	62,140
Sodium compounds (except nitrate)	cwts.	20,367	14,664
Zinc oxide	tons	627	358
Coal tar intermediates (including aniline oil and salt, and phenyl glycin)	cwts.	536	1
Alizarin	cwts.	303	107
Synthetic Indigo	cwts.	19	—
Unspecified coal tar dyes	cwts.	5,169	3,422
Barytes (including blanc fixe)	cwts.	68,016	54,665
Unspecified painters' colours	cwts.	53,949	44,292
Mercury	lb.	561,067	—

DECREASES.

Glycerin, crude	cwts.	386	6,472
Glycerin, distilled	cwts.	267	662
Red lead and orange lead	cwts.	1,501	2,035
Potassium nitrate	cwts.	4,860	9,407
Potassium compounds (except nitrate)	cwts.	204,429	268,213
Cream of tartar	cwts.	3,134	4,401
White lead	cwts.	11,021	13,112

Exports for May

INCREASES.

		1923.	1922.
Acid, sulphuric	cwts.	2,225	1,193
Acid, tartaric (including tartrates)	cwts.	1,769	244
Ammonium sulphate	tons	21,476	4,725
Bleaching powder	cwts.	30,296	15,639
Anthracene	cwts.	510	48
Benzol and Toluol	gals.	301,158	6,787
Carbolic acid	cwts.	21,613	12,897
Naphtha	gals.	13,722	8,652
Naphthalene	cwts.	21,966	2,675
Tar oil, creosote, etc.	gals.	6,248,029	3,324,352
Unspecified coal tar products	cwts.	41,196	25,170
Copper sulphate	tons	8,441	6,571
Glycerin, crude	cwts.	11,478	214
Glycerin, distilled	cwts.	7,697	1,631
Potassium chromate and bichromate	cwts.	5,163	2,197
Other potassium compounds (except nitrate)	cwts.	2,732	2,488
Sodium carbonate, ett.	cwts.	554,712	374,189
Sodium chromate and bichromate	cwts.	4,845	4,609
Sodium sulphate, including saltcake	cwts.	180,602	148,593
Other sodium compounds (except caustic soda)	cwts.	64,808	59,976
Zinc oxide	tons	314	273
Coal tar dyes	cwts.	10,051	3,229
Other synthetic dyes	cwts.	6,548	4,129
Paints, etc., ground in oil or water	cwts.	32,920	19,086
Paints and enamels ready mixed	cwts.	26,521	17,938
Painters' colours, etc., unspecified	cwts.	64,302	45,095

DECREASES.

Ammonium chloride	tons	352	475
Potassium nitrate	cwts.	1,801	1,937
Caustic soda	cwts.	137,386	144,183
Barytes, including blanc fixe	cwts.	2,072	4,958
White lead	cwts.	17,049	18,150

Is Formaldehyde a Synthetic Organic Chemical?

Opening of the Official Inquiry

A COMPLAINT in regard to formaldehyde was heard by Mr. Cyril Atkinson, K.C., the Referee under Part I. of the Safeguarding of Industries Act, on Friday, June 15. The complaint was made by the Chemical Merchants' and Users' National Vigilance Committee that this substance was improperly included in the list of articles chargeable with import duty published by the Board of Trade. The complainants were represented by Mr. Kenneth Swan and Mr. R. Lambert Parry. The Board of Trade was represented by Mr. Trevor Watson, and in support of the Board of Trade's view there were Messrs. Synthite, Ltd., of Birmingham, and others, for whom Sir Arthur Colefax, K.C., and Mr. Stafford Cripps appeared.

The Complainants' Case

MR. SWAN, for the complainants, said that formaldehyde, at normal temperatures, was a gas, but it was handled commercially as a solution, containing 40 per cent. of formaldehyde by volume and from 36 to 38 per cent. by weight. Its chemical formula was CH_2O, and it was discovered by a chemist named Hofmann in 1868. It had always been used in the form of solution, originally as a disinfectant, but it had made very rapid strides in industry, and was now used for a large number of purposes. The world production was in the neighbourhood of 10,000 tons per annum, and perhaps more, the solution being sold by the gallon, the barrel, or the ton. From the beginning, its manufacture had been substantially by one generic method. The raw material was methyl alcohol, obtained by the destructive distillation of wood, and the vapour of the methyl alcohol was passed over a heated catalyst. Originally, he believed, the catalyst was either of pure platinum or of asbestos covered with platinum; also, silver was employed, but copper was now very generally used as the catalytic material. The manufacture of formaldehyde was simply a two-stage process, namely, the destructive distillation of wood, resulting in methyl alcohol, which was further disrupted by the action of the catalyst, producing formaldehyde. He submitted that a chemical obtained in the manner he had described had none of the elements of synthesis in it, and could not in any sense be described as synthetic. The complainants had searched text books, and with one exception had been unable to find any in which formaldehyde, produced as he had described, was referred to as a synthetic organic chemical. The exception was a book in which the author stated that he had departed from the common practice of nomenclature in calling every artificially produced chemical a synthetic chemical. His evidence would show that it had never been regarded by the trade as a fine chemical, and that the manufacturers who produced formaldehyde were those who handled a heavy class of chemical, and not a fine class. The variety of uses to which formaldehyde was put stamped it as a general or industrial chemical. It was used for hardening leather, for coagulating glue, for fixing glues and sizes, for the paper industry, for fixing and discharging colours in the textile industry, for waterproofing, for artificial silk production, for making artificial ivory, for artificial varnishes and resins, for preserving meat carcases, and as a disinfectant. Upwards of 90 per cent. of the material was used for those purposes. Not more than 1 or 2 per cent. was used in pharmacy.

In reply to the Referee, MR. SWAN said that the 40 per cent. solution was the only commercial form of formaldehyde.

SIR ARTHUR COLEFAX said it was used as a gas in some cases and as a solution in others.

MR. SWAN replied that it was handled as a solution, and it was the solution that was taxed.

To the Referee's suggestion that it might have been easier to say the gas was a fine chemical than to say the solution was, MR. SWAN said that formaldehyde happened to be a gas at ordinary temperatures, but at minus 20° C. it became a liquid.

An Analytical Chemist's Evidence

MR. E. PARRY (analytical chemist), in confirming the statements made by Mr. Swan, said that recent investigations recorded in last year's edition of *Thorpe's Dictionary* had established that the formation of formaldehyde was due, not to oxidation, but to the catalytc dehydrogenation of methyl alcohol. It was not a direct combination of oxygen with the methyl alcohol molecule. It was a direct splitting off of hydrogen by heat, so that CH_4O broke down to CH_2O. The hydrogen so set free was a reaction quite independent of the process at all, and then oxygen was ready to combine with it, and formed water. Therefore, the statement that two differently constituted molecules combined was totally incorrect, because there was no molecular action at all.

THE REFEREE said he understood that the heat would not cause the reaction unless the copper were there.

MR. PARRY agreed, and said that the catalyst secreted or occluded the oxygen in some way. The catalyst had to be supplied with oxygen continually in order to keep the action going, and as the hydrogen combined with oxygen further oxygen was ready for it.

Following the Referee's request for a description of the process, SIR ARTHUR COLEFAX said he was going to call evidence *in camera* as to manufacture, because there was no book in which the process (by which commercial results were obtained) was described. If the complainants had a book which did so he would be surprised.

MR. PARRY said he had no practical knowledge of the manufacture of formaldehyde inside the works. His knowledge was general. There was no step or stage in the manufacture of formaldehyde which could be described correctly as synthetic. The one instance in which it was referred to as a synthetic chemical was in Professor Meldola's *Synthesis of Vital Products*. The term, as used in this work, had been given a wider meaning, so as to comprise both up-graded and down-graded products, and this was made clear in the preface to the book. He did not know any chemist who would accept Professor Meldola's remarks in the preface as being a true description of a synthesis. As to the claim that formaldehyde was an analytical reagent, he had never used it as an analytical reagent in his life, and had never heard of its being used as such. Reference was made to a number of trade journals which in their reports referred to formaldehyde among general or industrial chemicals, and not as fine chemicals. Answering further questions, Mr. Parry said he was quite certain, from general knowledge, that 90 per cent. of the formaldehyde of commerce was used for purely industrial purposes.

In connection with his contention that formaldehyde was a synthetic product, Sir Arthur obtained the admission from the witness that formaldehyde could be produced synthetical but was never so produced in practice. In the course of further discussion Counsel pointed out that the United States for Customs purposes classified formaldehyde as a synthetic organic chemical.

The inquiry was adjourned until Thursday, June 21.

Memorial to an Australian Chemist

THE James Cuming Memorial Chemistry Building, presented to the University of Melbourne by the Cuming, Smith Co. in memory of the late Mr. James Cuming, a chemical manufacturer, has been handed over to the University authorities by Mr. Norton Grimwade, chairman of directors of the company. Professor Sir David Masson dwelt on the interdependence of science and manufacturing, and referred to the late Mr. Cuming as a man distinguished by courage, foresight, and enterprise. One of his most important works was the establishment of a wood-distilling works. It was appropriate that his name should be associated with the University's activities in chemical research.

"Features I appreciate most"

A NORTHERN correspondent, in expressing thanks for assistance, writes:—"Concerning your enquiry as to what features of THE CHEMICAL AGE I appreciate most, I think it is the general tone of the paper which is most striking. Also it keeps one informed of current doings in the scientific world, and of the substance of lectures given before societies. Its wide embrace of the industrial and purely scientific is perhaps the point which I personally most appreciate."

Annual Meeting of the Colour Users' Association

Chairman's Review of the Dyestuffs Situation

THE annual meeting of the Colour Users' Association was held in Manchester on Tuesday, June 19, Mr. H. Sutcliffe Smith presiding.

The CHAIRMAN, in proposing the adoption of the report, said that the Association was now a very live factor in the industry, and had reached this status, not because of its critical capacity, but because of its constructive help. The Association was now entirely free from the very serious liability arising out of the purchase of German dyestuffs in 1920. After protracted and difficult negotiations the stock had now been entirely disposed of without loss to the members. It was found in the course of the work of the Technical Advisory Committee that there was need for a closer liaison with the makers. After consultation with the Board of Trade and the Association of British Chemical Manufacturers, a Joint Technical Committee was appointed, consisting of four representatives of the Colour Users' Association and four representatives of the dyestuff makers. This committee was doing excellent work, and was officially recognised, not only by the Board of Trade, but by the Licensing and Development Committees. A very great service to the whole colour using trade had already been done by the committee's compilation of a list of colours not made in Great Britain, which had facilitated the work of the Licensing Committee in granting licences for such colours. Any matters arising out of the Safeguarding of Industries Act, as affecting the industry, could be safely left in the hands of the Vigilance Committee, and it was hoped the members would take full advantage of its assistance when necessary.

Dyestuffs Licensing and Development Committees

Throughout the year many conferences had been held between the users' representatives and the Council, at which difficulties and grievances had been discussed with beneficial effect. Applications on the ground of superiority of foreign quality were now dealt with expeditiously. The chief difficulty was with regard to applications because of price differences. The Licensing Committee officially informed the Association, on September 30 last, that, as a temporary measure, applications would be granted where the British prices were more than three times pre-war level and were higher than the current foreign prices. When an application was made for a licence the user had to state the price at which he could buy the foreign colour. If the colour could be made in this country, the British makers were given the opportunity of taking the business at the foreign price quoted or at three times pre-war price, whichever was the higher. If the makers could not accept the order on this basis, then a licence was granted to the users to import. It was understood, however, that the makers' representatives on the Licensing Committee only agreed to meet this foreign price competition provided financial assistance was furnished to the dye manufacturers by the Government. The makers definitely stated that they could not at present bring their prices down to three times pre-war level without financial assistance.

As to the Dyestuffs Development Committee, it was to be hoped they would consider the question of the cost of production, the prevention of overlapping, and the interchange of intermediates, in order to give the user some relief in the price of British-made dyes. They might also consider means of facilitating the production, at an early date, of dyestuffs not made in this country for which licences to import were now issued, the value of which, according to the Licensing Committee's report, granted during 1922, was as follows: Germany £375,675, Switzerland £694 740, and other countries £33,404. The committee, if vested with the necessary authority, should be of very real service on the constructive side.

Prices of Dyewares

The import prices of dyes and dyestuffs, as recorded in the Board of Trade returns, were at a very high level. For finished coal tar dyestuffs (exclusive of indigo and alizarine) the following were the average prices per pound: 1913, 11·7d.; 1920, 79·2d.; 1921, 66·7d.; and 1922, 65·9d. Many conferences had been held throughout the year with the makers and with the Board of Trade on this subject. The users' request to reduce prices to 200 per cent. above pre-war was not an unreasonable one, but the makers had stated that without financial assistance they could not possibly get down to a basic selling price of a maximum of three times pre-war. The whole cost of establishing the dye-making industry in this country was now being borne by the users. There was a further serious aspect of this situation which required to be considered, and that was the effect of the high prices of British products upon the prices of foreign colour sold in this country. The British makers were not the sole beneficiaries of these high prices, for the foreign producer undoubtedly took full advantage of the artificial condition of the British market consequent upon the Prohibition Act.

Whilst having no reason to doubt the statement by the British makers that they were making 80 per cent. of the colour used in this country, he was somewhat at a loss to account for the amount of colour that was still being imported into this country, because if it represented only 20 per cent. of the total used, the total cost to the users must be many times greater than they realised. During the three years ended 1922 the imports of foreign colour (exclusive of intermediates), according to the Board of Trade returns, were as follows:—

	Tons.	£
1920	10,397 ..	7,552,799
1921	2,985 ..	1,539,406
1922	2,880 ..	1,326,174

an average annual importation of 5,421 tons, value £3,472,793. It was a fair assumption that a considerable stock was carried forward from 1920 imports to 1921 and 1922, so that if the British makers were now selling 80 per cent. of the consumption, it would appear that the total colour going into use was well up to pre-war dimensions. From careful inquiries in well-authenticated sources he could not agree that the consumption was much in excess of 60 per cent. of the normal. It was evident, however, from the import statistics, that there was a considerable tonnage of foreign colour sold here which could be tackled by the British makers, and thus enable them to increase their output, which should bring down their prices to a reasonable level.

Reparation Dyestuffs

A deputation from the Council had had an opportunity of visiting the official in charge of the dyestuffs section of the Reparation Commission in Paris. Germany furnished a list monthly of 25 per cent. of its output, which was available for the Allies, who were, within a stipulated period, required to indicate the quantities of colours they desired according to agreed proportions. This country's share was about 4 per cent. of the 25 per cent. It was found, in practice, however, that the U.K. proportion of 25 per cent. of Germany's output of a great many special types of dyes was short of this country's actual needs; on the other hand, there were large quantities of dyestuffs available which were of no interest to us. After several conferences it was arranged that the German makers should supply more than 25 per cent. of specific dyes on Reparation account, provided that quantities were not taken in excess of the home consumption, that the export prices were credited to Germany for all quantities above 25 per cent. of each specific dyeware, and that the total quantities were not in excess of 25 per cent. of Germany's total production stipulated under the Committee. At the beginning of each quarter the Allies were called upon to lodge with the German makers particulars of their requirements under this new arrangement, whereby the German makers would make certain specific colours, which were charged on the following basis: 50 per cent. at the world's lowest price (generally the internal German price), 50 per cent. at the lowest price the I.G. had sold at in the receiving country during the month preceding the month of delivery, or during the month of delivery, whichever was the lower.

The users considered this new arrangement of considerable advantage to them, in that it was a satisfactory means of obtaining through Reparation colour either not made here or not made in adequate quantities. Unfortunately, however, the price ruling in this country which regulated 50 per cent.

of the quantities so imported was an arbitrary one, since; if the bulk of the colour was taken under Reparation, there was no competitive market; the result was that the I.G. could charge such a figure for 50 per cent. of the colour as the resultant average with the remainder at the internal German price gave them a substantial overall selling price. The Association was in close contact with the officials in charge of Reparation dyestuffs in Paris, and it was hoped to bring before them more adequately the users' needs and requirements at regular intervals, and in such a form as would be of practical assistance to them in the taking over of Reparation colour. According to the information furnished by the Board of Trade, it was obvious that this country was not making the fullest use of the facilities afforded by the Reparation Committee, and he would suggest that the whole procedure of obtaining Reparation dyestuffs should now be reviewed in the light of the experience of the past two years.

French Seizure of Dyewares

While there was as yet no official or definite information as to the course which the French and Belgian Governments proposed to adopt with regard to the stocks of dyewares which had been seized in the Ruhr Valley, he was satisfied that the British Government were closely watching the position and taking all possible steps to safeguard the rights of this country as to Reparation supplies. He had no doubt that the French and Belgian Governments would be ready to meet the British wishes in the matter.

British Dyestuffs Corporation

At the last annual meeting he submitted three distinct suggestions bearing on the establishment of the dye-making industry with particular reference to the British Dyestuffs Corporation, Ltd., namely: (1) That the Government should wipe out their loan to the company; (2) that the company should face a scheme of reconstruction; (3) that the directors should eventually see their way to arrange that the Corporation should be managed by men who had been brought up in the industry on the lines of the big textile associations. Much progress had undoubtedly been made by this Corporation in the variety and types of the colours which they now made, and in the improvement in their quality, but there was considerable dissatisfaction among the users on the question of high prices. He wanted to make it perfectly clear that the users did not ask the makers to bring their prices down to the general economic price level, but the makers stated that they could not effect any further reductions without serious losses.

Mr. C. C. Railton seconded the adoption of the report, which was carried unanimously.

The list of Members of Council was then presented and approved.

Messrs. Bayley, Wood and Co. were reappointed auditors of the Association.

Brunner-Mond Celebrations at Winnington

In celebration of the fiftieth anniversary of the commencement of the concern, the employees of Brunner, Mond and Co. were entertained at a fete at Winnington, Northwich, on Saturday, June 16. The guests of the firm, who included relatives and friends of the employees, totalled 23,000, and in addition to the Winnington fete there were similar but smaller celebrations at Middlewich and Sandbach. The function was really the culmination of a week of rejoicings, and the proceedings included a luncheon at Winnington Hall to all the members of the Brunner and Mond families scattered throughout the country, the members of the Chemical Employers' Federation, the Northwich and Winsford Urban Councils, and the Northwich Rural Council. Continuously from 3.30 to 8 p.m. there was open a refreshment tent where food was obtainable free. Every employee had also a ticket entitling him to two pints of beer or an equivalent of two ounces of tobacco, while to 8,000 children of the workers were presented souvenir mugs, bearing the portraits of the two founders of the firm, the late Sir John Tomlinson Brunner and the late Dr. Ludwig Mond. The round of entertainment comprised sports, music by the Irwell Springs and Barnton bands, a world's fair, to which there was free admission, Japanese acrobats, jugglers, tumblers, pierrots, daylight fireworks, dancing, scouts' displays, and tugs-of-wars. During the day gold medals were presented to 108 employees who have served forty years and upwards. It was a memorable occasion, worthy of a great firm.

Fine Chemicals in Industry

A Reply to the Home Critics

At the Mining Exhibition in London on Thursday, June 14, a meeting was held under the chairmanship of Sir Max Muspratt, of the United Alkali Co. (in the absence of Sir William Pearce) at which papers of chemical interest were read. There was no discussion upon them.

In a paper on "The Importance of Fine Chemicals in Industry," Mr. E. I. Lewis (Albright and Wilson, Ltd., Birmingham) said that during the war it was generally agreed that British industrial chemists, assisted by academical chemists, had a great and even dominant share in snatching national existence out of the cauldron of defeat, and everybody was determined that for Britain's future safety, for her industrial prestige, and for the chemist's present reward, the chemical industry, and particularly the fine chemical branch of it, should be established and maintained in England. But when the war was past, and danger appeared remote, some traders who had before been willing to count the cost, began to covet the profit. Chambers of Commerce, where merchants were in large excess, passed resolutions, and petitioned members of Parliament. They found their natural allies in the doctrinaires both of the legislature and of the Press. The combination had achieved some hearing and was ceaselessly on the platform.

The Rise of the Industry

The rise of the fine chemical industry, as we knew it to-day, dated from 1856, when Perkin discovered and manufactured in England the first coal-tar colour. This was 67 years ago, and Perkin had the greatest difficulty at the outset in obtaining his raw material—benzene. Then, a few colours only were made; to-day their number was legion, and hundreds of related compounds were used in the fight against pain and disease. Whilst the fine chemical industry had earned for Germany the admiration of the world, the great industries of Britain had suffered and were suffering because of their Cinderella. Let the established industries, therefore, put a period to their disabilities in so far as they were due to this cause by seeing to it that the fine chemical industry was also firmly established in Britain. Scores of new industries, some of them attacking and driving out trades of long and honourable tradition in other lands, had already sprung up in Germany, and in Germany alone, brought into being to exploit the incidental discoveries of the fine chemical works, and many more would assuredly arise.

Critics at Home

They could not have a real and lasting revival of the British fine chemical industry until the British people took a real and permanent interest in it. And that meant understanding acquired through wider education—not technical training—in science. The urgent task was to convert the British public, and even before they were converted, if possible they must check, or even surpress for a time, the tendency to belittle their own performances. Some of the very worst offenders in this respect—whose indiscretions were worth millions to Germany—were a minority of teachers of chemistry who had written to the technical and even public journals from time to time, casting quite unmerited aspersions upon the post-war achievements of British fine chemical manufacturers. Their strictures regarding the quality of some of the British products had been decisively repelled by a big majority, including the more skilful and experienced of their confrères.

The second complaint of these people that the number of fine chemicals as yet made in Britain fell very short of the corresponding number for Germany, was true enough; it was never denied. That was why the effort was being made, a successful effort, for already the number of fine chemicals produced here was fourteen times as great as in 1913. But these men should be the last to complain. No part of the British public knew better than they *ought* to know, how serious were the difficulties which pursued makers of pure chemicals. Their own daily troubles should have held their hand from throwing stones. When all was said, the men who were striving to-day to put a better aspect upon the business were trained by them or by their predecessors, another claim upon their modest forebearance and chivalry.

They should rather acknowledge the great advances that had already been made. Their more seemly rôle would have been as leaders in Britain in a crusade for promoting confidence in their uninitiated countrymen. If they would do that, they would also be helping to increase the openings for those of their pupils who were looking to the industry as a career. It was not, perhaps, altogether out of place to remind them that in the end the universities and schools depended for their continued existence upon the success of the British manufacturers—not upon the profits of the German manufacturers. When, as not seldom happened, men, for political or commercial advancement, got up in Parliament or other public places or wrote for publication in the Press, to make similar suggestions, it became a serious public scandal, and a deep injury to England's commercial prestige. Let those men also be ready to award praise for what had been done, and if they would make honest inquiry, and were true Englishmen, they would find much cause for thankfulness, albeit they might lose political capital.

There had always been a fine chemical industry in this country, but for many years it received little, if any, support from the British users of fine chemicals and none at all from the Government. It was not until the war that we realised its national importance. Since then it had grown to a considerable industry at short notice. The secrets of the fine chemical industry could be won only by a vast amount of patient and expensive research and many substances and processes must to all intents be rediscovered for one might hold in one's hand a fine chemical, understand exactly its nature and its relation to other compounds, and yet have a tedious work before it could be produced economically. To establish and maintain the fine chemical industry in Great Britain was a national task, worthy of a great people, and demanding from them both vision and staying power of a high order. Our folk had sometimes been misled, had sometimes faltered. Once we had the industry in our grasp, and then we lost it; the British had willed her return: "Eurydice is on the brink; will Orpheus look back?"

The French Potash Industry

Lecture by M. Mennecke

At the International Mining Exhibition at the Agricultural Hall, London, a lecture was given on "The French Potash Industry" by M. Mennecke, who said that the Alsatian potash deposit consisted exclusively of sylvinite, a salt formed by a mixture of KCl and NaCl, or mineral salt. It contained, in addition, 9 to 14 per cent. insoluble matter, composed principally of white clay and iron oxide, ·5 per cent. to 1·2 per cent. of water, 2 to 5 per cent. calcium sulphate, and a very small proportion of magnesium chloride. The seams were composed of alternating beds of sylvinite, more or less rich in potash, of NaCl and of shales. Although several faults were encountered the deposit was regular as a whole. The slopes are from 0° to 10° and 20°, seldom exceeding 30° as far as the galleries had been worked.

Method of Extraction

The raw salts were mined as follows:—Holes were drilled at the working face with electric or compressed air boring drills. Explosives were inserted and after detonation the broken material was loaded into wagons for transportation to the surface, where it was ground to a fineness of 0 to 4 mm. In this form the raw salts might be delivered for agricultural purposes under the name of sylvinite, containing 14 to 16 per cent. pure potash; rich sylvinite containing 20 to 22 per cent. pure potash; or might be refined in the chemical works to muriate of potash containing 80 per cent. KCl—*i.e.*, 50 per cent. K_2O or 98 per cent. KCl—*i.e.*, 62 per cent. K_2O.

The 98 per cent. muriate was used for chemical purposes and also for the manufacture of sulphate of potash used in agriculture. For the manufacture of 1,000 kilos muriate 3,000 to 4,000 kilos of raw salts were necessary. For each ton of muriate manufactured 250 to 300 kilos of coal were required. The manufacture of Alsatian muriate of potash simply depended on the difference of solubility in hot and cold water between potassium chloride and sodium chloride. Sodium chloride was less soluble at 10° than at 100°, while the contrary was the case with potassium chloride. At 100° C. 100cc. water could dissolve 39·5 gms. potassium chloride and 25·7 gms. sodium chloride; at 10° C. 12·5 gms. KCl and 29 gms. NaCl. A hot saturated solution of KCl and NaCl deposited on cooling 23·4 gms. KCl.

Muriate of Potash

The crushed raw salt was brought to a temperature of 107° C. in a specially constructed tank through which spirally arranged steam pipes pass, and was there mixed with a solution of NaCl used in a former operation. This mother liquor dissolved only KCl, and on coming out of this tank passed through decantation vats where most of the mud from the shale was deposited. The solution was then led to crystallisation tanks where it was gradually cooled to the surrounding temperature. According to the principle stated above the KCl alone was deposited and the NaCl remained in solution. When all the KCl had separated out, the mother liquor was removed and used for another operation, whilst the crystallised KCl, after draining, was sent to a drying plant.

With regard to the manufacture of sulphate of potash the process was based on the action of sulphuric acid on potassium chloride according to the following equation:—

$$2\,KCl + H_2SO_4 = K_2SO_4 + 2HCl$$

whereas the German method was based on the double decomposition of $HgSO_4$ and KCl.

Control and Production

In 1914 the potash mines of Alsace were divided into four groups, of which three were German and one French. During the war the mines belonging to the French group were put under the control of a German commissionaire, and their director, Mr. Fernand Vogt, was imprisoned and sent to Germany. At the present time the mines of the German groups were sequestrated and the general direction is assumed by Mr. P. De Retz, Industrial Liquidator, Mr. Ernest Helmer at Mulhouse being juridicial liquidator and in charge of legal matters. Since the Armistice Mr. Vogt has taken over the general management of the French group, which consists of the mines of Kali Sainte Therese. The mines under sequestration and the Kali Sainte Therese had joined for the sale of the products and form the Société Commerciale des Potasses d'Alsace at Mulhouse. Recently, the French Chamber of Deputies brought in a law about the mediation of the mines under sequestration, and according to it the mines would be exploited by a single Society in which the different groups interested in potash would be represented. This law would shortly be discussed by the French Senate.

Since Alsatian mines had come under the management of French directors the production had been considerably increased. Whilst the highest figure of extraction reached by the Germans in 1913 was only approximately 350,000 tons crude salt, the amount extracted in 1922 was 1,326,727 tons, or nearly four times the German total for 1913.

If, however, we considered, instead of the output, the quantity sold and dispatched calculated in pure potash, we came to the following figures. (It might be remembered that the raw salts contain ordinarily 15 to 20 per cent. K_2O.):—1913, 52,500 tons K_2O; 1922, 224,716 tons K_2O. The progression had been a constant one with the exception of 1921, which was a year of exceptional crisis. At present, the mines and works were equipped to produce yearly 500,000 tons K_2O—*i.e.*, they could extract annually more than three million tons of raw potash salts. Should the demand increase, the mines could rapidly reach an output of five million tons raw salt per annum, which would correspond to 800,000 tons K_2O. On account of the constant rise in the prices of freight and labour it seemed that in times to come the use of concentrated fertilisers would greatly increase, especially in those countries remote from the seat of production, and the mines of Alsace had made the necessary preparations to meet this contingency.

At the present time the different KCl plants, working normally, were able to furnish yearly more than 250,000 tons KCl of 50 to 60 per cent. K_2O. Moreover, they would soon be able to satisfy a large proportion of the demand for sulphate of potash.

Chemical Matters in Parliament

Queensferry Munitions Factory

In reply to Mr. Hill (House of Commons, June 14), who inquired whether the Queensferry munitions factory had been sold to the Anglo-Scottish Finance Co., Sir W. Joynson-Hicks stated that the factory, the original cost of which was approximately £4,000,000, had not been sold, and with the exception of the electric power plant was still for sale.

White Lead Convention

The Home Secretary in reply to Mr. A. Greenwood (House of Commons, June 14), who asked whether he was aware that, out of eight cases of lead poisoning among painters and plumbers, six were fatal, and whether in view of these facts he will urge the Government to ratify the white lead convention as recommended by the Norman Committee, said that the question of ratifying the convention is receiving careful attention.

Dangerous Drugs

The Home Secretary (House of Commons, June 13), in reply to Captain Hay, who asked him for the number of factories in Great Britain where morphia and heroin were made, the amount of these drugs manufactured last year (1922) and the quantity sent abroad, said that the number of factories licensed at the present time for the manufacture of morphine and heroin was two. The amount of morphine made in 1922 was 315,342 oz., of which, however, 173,010 was converted into codeine or heroin, leaving a net total of 142,332 oz. The amount exported was 115,465 oz. The amount of heroin made in 1922 was 31,673 oz., and the amount exported 25,911 oz.

Glassware Imports

Mr. Entwistle (House of Commons, June 19), required as to the trouble and expense involved in complying with the requirement that consular certificates of origin should accompany all consignments imported from the Continent of glassware falling under the provisions of the Safeguarding of Industries Act.

Sir P. Lloyd-Greame said that the Government were only awaiting the reply of the Belgian Government on certain minor points of detail, before bringing into force arrangements whereby in the case of Belgium these certificates would be replaced by certificates issued from approval chambers of commerce in that country.

British Dyes, Ltd.

Mr. W. M. Adamson (House of Commons, June 18) asked the Financial Secretary to the Treasury whether he was aware that British Dyes, Ltd., were enforcing a further ½d. per hour reduction in wages in two cuts upon their employees; if he had been informed that no agreement to this reduction was decided upon by the Chemical Joint Industrial Council; whether arbitration had been refused; and, in view of the Government holdings in this concern, if he would institute proceedings of inquiry and conciliation toward settlement.

Sir W. Joynson-Hicks replied that he understood that the reduction referred to was one applying generally to the trade, and there seemed no reason for instituting an inquiry regarding its application to a single undertaking.

Ruhr Occupation and British Trade

Captain W. Benn (House of Commons, June 18) asked the Under-Secretary of State for Foreign Affairs whether the High Commission had imposed new Customs duties and demanded new Franco-Belgian licences in respect of goods imported from unoccupied to occupied Germany; and whether this new ordinance applied to goods reaching the British occupied area.

Viscount Wolmer said that for goods coming from unoccupied Germany into occupied territory on and after June 25th a permit would be required and Customs duties would be charged at the rate of 25 per cent. of the Rhineland import tariff. This would apply to goods reaching the British occupied area, but would not apply to goods imported into that area through Germany from a country other than Germany.

Oil Boring

Mr. Shinwell (House of Commons, June 19) in the continued discussion on the Oil Borings, asked the Secretary for Mines, Lieutenant-Colonel Lane Fox, whether he could state the results of the investigations regarding the existence of oil wells in the Lothians; and whether, in the event of the results proving satisfactory, the Government would be prepared to grant financial assistance. Lieutenant-Colonel Lane-Fox said that each boring cost about £50,000, and the amount of oil produced, about £30 worth. The Government were of opinion that enough money had been spent, and that they should not spend any more. The investigations which had been carried out showed that there was no reasonable chance of getting a return.

Mr. C. White (House of Commons, June 12) asked the Financial Secretary to the Treasury the total cost to the Government of the oil-boring experiments at or near Hardstoft, in the County of Derby; and whether the work had now been abandoned.

Lieut.-Col. Lane-Fox said that the estimated net cost of the seven bore-holes in Derbyshire, after making allowances for the sale of plant and material and of the oil produced at Hardstoft, was approximately £300,000. All the work undertaken for the Government under the Pearson Agreement had been brought to an end, but the Hardstoft well had been taken over by the Duke of Devonshire, the owner of the land, to whom a licence has been issued under the Petroleum Production Act. The remaining six bore-holes in Derbyshire had been plugged and abandoned.

Czechoslovakia (Commercial Treaty)

Mr. Morel (House of Commons, June 12) asked the President of the Board of Trade whether the new Clause in the proposed Commercial Treaty with Czechoslovakia specifically provided that the Safeguarding of Industries Act would not be used against Czechoslovakian goods; and whether the delay of two years since the beginning of negotiations for the Treaty was due to obstacles arising from the Safeguarding of Industries Act.

Sir P. Lloyd-Greame, who regretted that he was unable to give information as to the purport of the new Clause which had provisionally been agreed upon, said that the delay in the conclusion of the Treaty was due to a number of causes, some of which were still under discussion.

Captain Wedgewood Benn asked if it might be taken that the Safeguarding of Industries' Act would not be repealed by a Treaty without reference to the House?

Sir P. Lloyd-Greame replied that nothing unconstitutional would be done, and that if anything were done under any treaty it would be done in accordance with the law.

Magadi Soda Company's Affairs

An extraordinary general meeting of the Magadi Soda Co. Ltd., was held by requisition to consider resolutions, appointing a committee of shareholders to inquire into the company's past management and future prospects, such committee to consist of Messrs. A. P. Pennell, E. Harlow, H. L. Slocock, and H. J. Stephens, with power to co-opt others, and adjourning the meeting for eight weeks to consider the committee's report. After considerable discussion the resolutions were lost on a show of hands, and the representatives of the shareholders' committee demanded a poll. It was stated that the result of this will be announced later. The directors are opposed to the appointment of a committee of investigation on the ground that it would unnecessarily delay proceedings with the scheme of reconstruction now being formulated by the directors under which new capital would be provided.

Disadvantages of a Turpentine Substitute

In a recent note in the *Chemiker Zeitung*, A. Lauffs draws attention to the reddening of surfaces painted white with paint in which tetralin (tetrahydronaphthalene) had been used as a substitute for turpentine, and where a manganese drier had been added. Tetralin, in the presence of even very small amounts of manganese, has been found to give this colour in every case. Hence, if tetralin is being used in a white paint, it is essential that the drier and the pigments used be free from traces of manganese, and, finally, that in the mixing of the ground colour no manganese must be added. Lithopone containing only 0·005 per cent. Mn. gave a quite distinct colour on warming with tetralin in a porcelain basin.

The Eve of the Cambridge Meetings

(From Our Special Correspondent.)

Cambridge, Wednesday, June 20.

Cambridge this week has got rid of its undergraduates and instead has developed the conference habit, there being two conferences in the week, the International Union of Pure and Applied Chemistry from Monday till Wednesday, and the Society of Chemical Industry from Wednesday till Saturday. An undergraduate journal recently solemnly proved that Cambridge was the centre of the Universe, but it requires no proof that the centre of Cambridge this week is the Arts School, where the headquarters of both conferences are situated. The local organisation of both meetings is in the hands of Mr. J. E. G. Harris, Professor Pope's assistant, who distributes tickets for various functions and answers questions in different languages for the benefit of international delegates without disturbing his smiling manner.

French is the official language of the International Union, and notices in that tongue are to be found in various parts of the town and greet the visitor on arrival at the station. A number of chemical research workers are acting as stewards, and they occupy an office on the station platform in order to direct delegates to the specially chartered motor which carries them to their destination. At least one member of the Institute of Chemistry was grossly insulted—or highly honoured—by one of these stewards who inadvertently addressed him in French!

The majority of the members of the Society of Chemical Industry also took advantage of both conferences being at the same town, by attending the meetings of the International Union, and a large number of the foreign delegates have decided to remain for the S.C.I. meetings, so that the coincidence of the two conferences has resulted in some useful mutual propaganda, and also in better attended meetings for both parties, there being in all nearly two hundred delegates present at the same time.

The idea of opening the proceedings in connection with the Society's congress with an informal smoking concert was an excellent one, as it enabled the visitors to wear off something of that awkwardness which is usually associated with the opening days of such a conference. The programme of the concert included a number of items of great interest mainly provided by eminent musical members of the University, but one—a skilled exhibition of juggling—was provided by one of the chemical research students, the son of Professor Kipping.

Distillation of Hardwood in Canada

The majority of the destructive distillation plants in Canada have been absorbed by the Standard Chemical Iron and Lumber Co. of Canada, Ltd., now reorganised as the Standard Chemical Co., Ltd., Montreal. Central alcohol refineries have been established at Longford, Ont., and Montreal, Que., acetone plants at Longford and Sault Ste. Marie, Ont., acetic acid and formaldehyde plants in Montreal. Considerable quantities of charcoal are used by a subsidiary, the Standard Iron Co., Ltd., in making charcoal iron. Distributing companies have been formed to market charcoal in the principal cities as household fuel.

During the war the demand for acetone, methyl alcohol, formalin and other hardwood distillation products was very great and it is a significant fact that a single well-organised company handles practically all operations from the cutting of the wood to the manufacture and sale of the finished chemicals.

Volumetric Estimation of Sulphates

It was stated recently in the *Chemiker Zeitung* (p. 366) that good results in the volumetric estimation of sulphates may be obtained by using a modification of Grossmann's method.

The sulphate is mixed with baryta water, the excess of which is precipitated by the addition of excess of ammonium carbonate. The ammonia formed, as well as the excess ammonium carbonate, are then boiled off, and the alkali carbonate formed is titrated with standard hydrochloric acid, using methyl orange as indicator. Any free acid must be exactly neutralised with caustic soda before adding the baryta water, which is used as a cold-saturated solution, whilst the ammonium carbonate is of about N/5 strength.

From Week to Week

Dutch financiers are reported to have bought an interest in the chemical works of Lubscynski and Co., Berlin.

An outbreak of fire occurred on Saturday evening in the chemical department of the Garston Bobbin Works, in a room containing 250 bags of charcoal.

Dr. R. C. Menzies, of the University of St. Andrews, has been appointed Assistant Lecturer in Chemistry in the University of Bristol in succession to Mr. Fullman, who has resigned.

Mr. John D. Rockefeller has presented to the University of Toronto 5,000 dollars, to be used for research in insulin, to be conducted by Dr. F. G. Banting, discoverer of the insulin treatment for diabetes.

Messrs. Courtaulds, Ltd., it is reported, have decided to put down in Canada, near Quebec, a large plant for the manufacture of artificial silk yarn, and the scheme is likely to be carried out very shortly.

In the course of debate on the Finance Bill in the House of Commons on June 19, it was stated that during the War the distillers of this country contributed 50,000,000 gallons of alcohol for making high explosives.

Dr. H. S. Raper, Professor of Psychology and Biochemistry in the University of Leeds, has been appointed Brackenbury Professor of Physiology and Director of Physiological Laboratories as from September next in the University of Manchester.

The first award of the Paternò medal by the Italian National Association for Pure and Applied Chemistry was made on Tuesday at Cambridge to Dr. F. W. Aston, in recognition of his work for theoretical chemistry in connection with isotopes.

Professor Wilder Bancroft, the professor of Chemistry at Cornell University, U.S.A., gave a lecture at Liverpool, University on Tuesday, June 12. The subject was "Bubbles drops and grains," which was treated in semi-popular and racy manner.

The coming of age of the Manchester College of Technology will be celebrated on Thursday, July 5, when a conversazione will be held. The guests will be received by the Lord Mayor of Manchester (Councillor W. Cundiff), and Viscount Burnham will be the guest of the evening.

Jackson Bros. and Co., Hulme Hall Chemical Works, Miles Platting, Manchester, announce that they are about to take over new works, and that all communications should now be addressed to Jackson Bros. and Co., Trafford Park, Manchester. Telegraphic address unchanged; Telephone No.: Trafford Park 637.

The twentieth annual general meeting and convention of the Institution of British Foundrymen was opened at the School of Technology, Manchester, on Wednesday, June 13. The members were welcomed by the Lord Mayor (Councillor W. Cundiff), Mr. Mouat Jones, the Principal of the College, and representatives of the local industries.

As a result of the agreement between American and Sicilian sulphur producers, there has been an increase in price of sulphur by some 4s. to 8s. per ton delivered at European ports. At the present time the delivered price of American sulphur in the United Kingdom is approximately $21, and in Spain and France about $22.50, and Sicilian prices are on a parity.

The twenty-fifth pharmacy exhibition was opened at the Central Hall, Westminster, on Monday for a week. This is on an extensive scale and contains numerous exhibits of drugs and pharmaceutical products such as scents, soaps, and all the "etceteras" to be found at a pharmacist's shop, numbering in all some 4,000 proprietary brands, the majority of which are based upon products of the chemical industry.

Mr. E. C. Williams, M.Sc. (Manchester), has been appointed as from August 1, to the new Ramsay Memorial Chair of Chemical Engineering, tenable at University College, London. He has been on the scientific staff of British Dyes, Ltd., and head of the department for the manufacture of intermediate products under the British Dyestuffs Corporation. Since 1921 he has been Research Chemist to the Joint Research Committee of the University of Leeds and the National Benzole Association.

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197,712. DISTILLATION OF COAL AND SIMILAR CARBONACEOUS SUBSTANCES. T. M. Davidson, Park Cottage, Sharps Lane, Ruislip, Middlesex, and R. H. S. Abbott, Alexandra Mansions, King's Road, Chelsea, London, S.W. Application date, January 12, 1922.

This is a development of the carbonising process described in Specification 195,711 (see THE CHEMICAL AGE, Vol. VIII., p. 518). The feeding worm employed to move the charge forward is given a periodic reciprocation, so that in its forward movement the charge is compressed and fed forward. The worm is then given a reverse rotation so that it withdraws from the charge without moving it, and this is followed by another forward movement. The worm may be situated in the annular space between a vapour outlet tube and the wall of the retort.

197,724. SULPHATE OF AMMONIA, MANUFACTURE OF. Pease and Partners, Ltd., and G. Stephenson, Darlington, Durham. Application date, February 13, 1922.

The process is for neutralising the acid sulphate of ammonia obtained from the saturator, without the use of an aqueous solution of ammonia. The acid salt, either before or after drying, is treated in a closed vessel with coke oven gas, with or without steam. The ammonia in the coke oven gas neutralises the acid in the salt, and the gas is then passed on to the by-product recovery plant. When the "direct" process is used, the gas is withdrawn from the main at a point before the ammonia saturators, and when the "indirect" process is used, the gas is withdrawn at a point before the water scrubber of the recovery plant. The neutralising vessel may be placed in series with the main or in a by-pass.

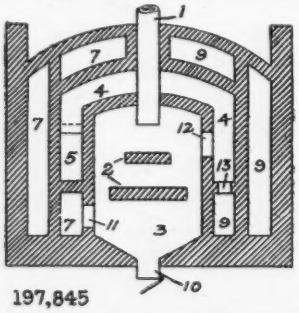
197,809. AZO COMPOUNDS, PREPARATION OF. A. G. Green and K. H. Saunders, Crumpsall Vale Chemical Works, Blackley, Manchester, and British Dyestuffs Corporation, Ltd., Imperial House, Kingsway, London, W.C.2. Application date, April 5, 1922.

The process is for preparing diamido azo compounds containing a methyl-omega-sulphonic group, particularly suitable for dyeing acetyl silk when containing no sulphonic acid group in the nucleus. Compounds having the general formula $X.N_2Y.NH.CH_2.SO_3H$ are obtained by combining diazo compounds with the methyl-omega-sulphonic acids derived from primary amines. Such compounds which contain a nitro group in the para position of the nucleus X may be reduced by means of sodium sulphide to obtain diamido azo compounds in which the methyl-omega-sulphonic radicle remains attached to one of the amido groups. Disazo compounds having the general formula :—

$$X.N_2Y.N_2Z.NH.CH_2.SO_3H$$

may be obtained in a similar manner and reduced to the diamido-disazo compounds. Several examples are given of the preparation of these compounds, which dye acetyl silk yellow from a slightly acid bath.

197,845. SULPHUR, METHOD OF, AND APPARATUS FOR BURNING. A. T. Prentice, Dynamite Factory, Somerset West, South Africa. Application date, June 9, 1922.



197,845

Sulphur to be burned is introduced through a pipe 1 and falls on the trays 2 in the combustion chamber 3. This chamber is surrounded by a supplementary combustion chamber 4 for the vaporised sulphur, and by air flues, 7, 9. Air enters the flue 7 at the top, through a valve, and passes in a zig-zag path through the flue to its outlet 11 leading to the chamber 3, the air being preheated by conduction from the chambers 3 and 4. Sulphur dioxide and some sulphur vapour pass into the chamber 4, into which a secondary air supply passes through a preheating flue 9, which is also heated by the chamber 4, and then through an opening 13. Sulphur dioxide is withdrawn through the outlet 5. A more complete combustion of the sulphur may be obtained by this apparatus.

197,848. THYMOL, MANUFACTURE OF. Howards and Sons, Ltd., Uphall Works, Ilford, Essex, and J. W. Blagden, Apple Tree House, Grove Road, South Woodford, Essex. Application date, June 15, 1922.

The process avoids the formation of by-products which are obtained when thymol is made by condensing mono-sulphonated meta-cresol with isopropyl alcohol. This result is obtained by using poly-sulphonated meta-cresol and isopropyl alcohol. The cresol is first sulphonated so as to produce the di- or tri-sulphonic acid, and the product is then condensed with isopropyl alcohol. This product is then treated with steam to eliminate the sulphonic acid groups. In an example, meta-cresol 54 parts is added slowly to 125 parts of oleum containing 88 per cent. of SO_3. This mixture is heated to 100° C. for two hours, and then to 150° C. for two hours. A solution of 35 parts of isopropyl alcohol in 50 parts of 98 per cent. sulphuric acid is then added, and the mixture heated to 80°–90° C. for some hours. The product is heated to 130° C. and treated with steam to distil the thymol. About 50–55 parts of thymol are obtained, containing very little of the isomer.

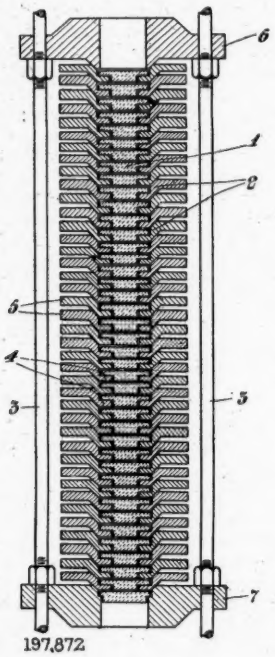
197,863. PHOSPHORUS PENTOXIDE, MANUFACTURE OF. Sir R. Threlfall, Oakhurst, Church Road, Edgbaston, Birmingham. Application date, July 6, 1922.

It is found that phosphorus may be burnt in a current of air under such conditions that the oxide deposited is much less bulky than the usual product, and consists of crystals which tend to cohere together. The phosphorus pentoxide vapour is passed into a chamber, the walls of which are maintained at a temperature above 125° C., but not above 190°–200° C. Under these conditions the pentoxide which condenses is crystalline. In an example, the condensing chamber is a lead cylinder, 2 ft. 6 in. diameter and 6 ft. high. Phosphorus is fed into an iron pipe of 2 in. diameter which enters the condensing chamber horizontally at the bottom. About 2 lb. of phosphorus per hour is fed into the pipe, and burned by drawing air through, into a drying tower supplied with sulphuric acid of 1·8 specific gravity. The phosphorus pentoxide which deposits on the cylinder opposite the admission pipe, is of the required crystalline kind. The crystalline deposit contains some finely-divided amorphous oxide, but this may be avoided by withdrawing the pentoxide through a filter of glass wool at a point where the temperature is about 160° C. The pentoxide is drawn into a condensing chamber kept at 125°–150° C. by means of an aspirator.

197,872. CARRYING OUT HIGHLY EXOTHERMIC CATALYTIC REACTIONS BETWEEN GASES, PARTICULARLY CATALYTIC OXIDATION OF AMMONIA WITH OXYGEN, APPARATUS FOR. I. W. Cederberg, 16, Landshuterstrasse, Berlin, and H. M. Bäckström, Djursholm, Sweden. Application date, July 14, 1922.

The apparatus is of the kind in which the catalyst zone is divided into a large number of contact units, so that the progress of the reaction may be controlled by controlling the cooling of the various units. When porous plates are used as contact carriers, some of the reaction mixture may pass through unchanged through the space between the contact plates and the wall of the surrounding cylinder, and it is difficult to cool the plates owing to bad conduction. The object is to avoid these inconveniences. The catalyst, such as finely divided platinum, is precipitated on plates 1 of pumice stone, which are mounted in a chamber consisting of a series of metal rings 2. Each ring is provided with a conical bearing surface which seats on a corresponding surface on the adjoining ring, and the structure is held together by bolts 3. The plates 1 are held between flanges 4 on the metal plates, and

external flanges 5 are provided to cool the apparatus. Any of the gas mixture which passes around the plates 1 is subjected to a continual change of direction and is thus brought into intimate contact with the catalyst. The contact plates



197,872

may readily be replaced when required. The apparatus may be constructed of aluminium or a nickel alloy, and is particularly applicable for the oxidation of ammonia.

197,887. Electrolytic Separation of Pure Chromium in Thick Layers, Process For. G. Brewer, London. From F. Krupp Akt.-Ges., Essen, Germany. Application date, September 28, 1922.

When chromium is deposited electrolytically, it usually peels off the electrodes in thin layers, but the conditions have now been found under which thick and coherent deposits may be obtained. These are (1) The presence of chromic acid or chromium trioxide. (2) The presence of a salt of trivalent chromium, such as the sulphate. (3) The presence of a chromic chromate. (4) The proportion of chromium trioxide to chromic oxide (Cr_2O_3) must be greater than 2 : 1. (5) The ratio of the current density at the anode to the cathode must be such that the chromium oxides produced, which are lower than chromium trioxide, are oxidised continuously to chromium trioxide at the anode. In an example, a solution containing 25 per cent. of chromium trioxide, and some chromic sulphate, sulphuric acid, and chromic oxide, is electrolysed without a diaphragm. Lead peroxide anodes are used, a cathode current density of 10 amperes per square decimetre, and an anode current density of 5 amperes per square decimetre at ordinary temperature. Pure chromium is thus obtained free from carbon.

197,898. Alkali Thiosulphate, Manufacture of. Rhenania Verein Chemischer Fabriken Act.-Ges. Zweigniederlassung Mannheim, Mannheim, Germany, and F. Rüsberg, 250, Kafertalerstrasse, Mannheim, Germany. Application date, January 23, 1923.

Sodium thiosulphate is obtained by treating a solution of alkali sulphite and bisulphite with sulphuretted hydrogen at a raised temperature according to the equation :—

$$2\ Na\ HSO_3 + 2Na_2\ SO_3 + 2\ H_2S = 3\ Na_2S_2O_3 + 3\ H_2O.$$

To obtain the sulphuretted hydrogen, crude barium sulphide is decomposed by hydrochloric acid, nitric acid, or magnesium chloride. Any barium which is present as silicate, aluminate or carbonate is thus recovered also. Alternatively, the crude barium sulphide may be first lixiviated with water, and the barium sulphide solution then treated with acid.

Note.—Abstracts of the following specifications which are now accepted appeared in The Chemical Age when they became open to inspection under the International Convention :—183,806 (Soc. Chimique des Usines du Rhône) relating to the dyeing of cellulose acetate, see Vol. VII, p. 462 ; 184,800 (J. Gradl), relating to the manufacture of artificial manures, see Vol. VII, p. 570 ; 187,619 (Consortium für Elektrochemische Industrie Ges.), relating to the manufacture of resins from aldehydes, see Vol. VII, p. 943 ; 188,311 (New Jersey Zinc Co.), relating to the manufacture of lithopone, see Vol. VIII, p. 15 ; 188,632 (Akt.-Ges. für Anilin Fabrikation), relating to a process for dyeing wool with dyestuffs capable of being chromed, see Vol. VIII, p. 69.

International Specifications not yet Accepted

196,579. Glycerin Soap. L. Schmidt, 56, Gernerstrasse, München, Germany. International Convention date, April 21, 1923.

Moist soap or fat saponified by dry or concentrated alkali or dry alkali peroxide is dried and the glycerin extracted by a volatile solvent such as acetone, methyl-ethyl ketone, methyl acetate, ethyl acetate, methylal, or absolute ether. The solvent may be distilled off, and the anhydrous glycerin obtained may be bleached by carbon. A dry powdered soap remains. A detailed example is given.

196,585. Ammonium chloride lyes. Henkel et Cie and W. Weber, Düsseldorf, Germany. International Convention date, April 22, 1922.

The residual lyes from the ammonia-soda process, containing ammonium chloride, may be evaporated in a galvanised vessel, or in an iron vessel containing a zinc compound such as zinc chloride, without corrosion of the vessel. A weak direct electric current may also be passed through the liquor, and a zinc anode may be used. Sodium chloride crystallises first and is removed, and the liquor is then cooled to crystallise ammonium chloride of 98–100 per cent. purity. The remaining liquor containing the zinc may be mixed with fresh lye and used again.

Latest Notifications.

199,004. Method and apparatus for automatic regulation of the supply of oxidizing-agents, nitric acid, nitrate-solution, or others in the manufacture of sulphuric acid. Aktieselskab Dansk Svovlsyre- and Superphosphat-Fabrik, and Dansk Aktieselskab Siemens-Schuckert. June 9, 1922.

199,007. Manufacture of sulphovinic acid from ethylene. Compagnie de Bethune. June 8, 1922.

199,017. Method of manufacturing pure alumina from aluminates of the second group of the periodical system. Koritschoner, Dr. J., and Hansgirg, Dr. F. June 9, 1922.

199,025 and 199,030. Process for the manufacture of pulverulent catalysts. Urfer, C. June 12, 1922.

199,027. Process for the preparation of a metal, its hydride, or its nitride, in a pulverised state. Urfer, C. June 12, 1922.

199,032. Process for the synthetic production of ammonia. Urfer, C. June 12, 1922.

Specifications Accepted, with Date of Application

198,385. Formic acid, Manufacture and utilisation of. H. Nielsen and B. Laing. December 3, 1921.

198,387. Separation of materials by centrifugal apparatus. Plauson's (Parent Co.), Ltd. (*H. Plauson.*) January 3, 1922.

198,392. Acetyl cellulose, Manufacture of artificial silk from. W. J. Stevenson. January 30, 1922.

198,398. Azo dyestuffs, Manufacture of. W. Carpmael. (*Farbenfabriken vorm F. Bayer & Co.*) January 31, 1922.

198,415. Vat dyestuffs, Manufacture of. W. Carpmael. (*Farbenfabriken vorm F. Bayer & Co.*) February 27, 1922.

198,423. Ferro alloys, particularly ferro-chromium alloys, Manufacture of. R. Wild and A. H. Wild. March 1, 1922.

198,446. Centrifugally separating solids from liquids, Machines for. G. Johnson. March 7, 1922.

198,462. Quinoline and quinoline derivatives or compounds, Preparation of. J. O. Gardner and M. Williams. March 13, 1922.

198,488. Alloys containing chromium and iron. R. S. Mackenzie. March 22, 1922.

198,530. Coal gas, Manufacture of. Underfeed Stoker Co., Ltd., and S. McEwen. April 26, 1922.

198,545. Acids, Treatment of. I. Hechenbleikner and T. C. Oliver. May 13, 1922.

198,576. Metaldehyde, Manufacture or preparation of. J. Y. Johnson. (*Elektrizitätswerk Lonza.*) June 28, 1922.
198,615. 1-phenyl-2-3-dimethyl-4-dimethylamine-5-pyrazoline. H. R. Napp. (*Chemische Werke Altstetten Akt.-Ges.*) October 27, 1922.
198,625. Heat treatment by means of a bath of molten metal, Apparatus for. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and Sir A. M. Duckham. December 30, 1922.
198,634. Azo dye-stuffs, Manufacture of. W. Carpmael. (*Farbenfabriken vorm F. Bayer and Co.*) January 31, 1922.

Applications for Patents

Blagden, J. W., and Howard and Sons, Ltd. Manufacture of thymol, etc. 15324. June 12.
Carr, H. O. Extracting and recovering benzol, etc., from coal, etc., gases. 15705. June 16.
Cerasoli, A. Continuous fuel distillation retorts. 15630. June 15.
Chemische Fabrik vorm. Sandoz. Manufacture of cardiac glucoside of bulbus scillae. 15634. June 15. (Switzerland, June 17, 1922.)
Coley, H. E. Reduction of sulphates. 15617. June 15.
—— Reduction of carbonates, etc. 15618. June 15.
—— Methods of reduction. 15619. June 15.
Farbenfabriken vorm. F. Bayer and Co. Manufacture of azo-dyes. 15548. June 14. (Germany, July 18, 1922.)
Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of indigoid dye-stuffs. 15325. June 12.
Krafft, M. Purifying burner gases and obtaining chemically-pure sulphuric acid. 15401. June 13.
Pereira, H. Reduction of dioxyperylene. 15642. June 15. (Austria, June 19, 1922.)
—— Process for manufacturing dinitroperylenequinone. 15643. June 15. (Austria, June 20, 1922.)
—— Process of manufacturing aminoperylenequinones. 15644. June 15. (Austria, June 20, 1922.)
—— Process for manufacturing perylene vat dyes. 15645. June 15. (Austria, June 20, 1922.)
Stobie, V. Manufacture of chromium-iron alloys. 15463. June 14.
Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd. Apparatus for heat treatment of materials. 14670. June 4.
Urfer, C. Synthetic production of ammonia. 14954. June 7. (Switzerland, June 12, 1922.)

German Chemical Industry

A RECENT report from Germany states that the A. G. für Anilinfabrikation, Berlin, now has its new works for the manufacture of artificial silk in operation. It is not mentioned what process is being employed, but it is known that the company has been experimenting for some time with an acetate allulose process similar to that now being successfully worked by the British Cellulose Company. It is also said that the company intends to build two large new factories for the manufacture of dyestuffs, one near Bitterfeld and one which will specialise in the production of azo colours at Greppin. The Chemische Fabrik Griesheim-Elektron, Frankfort-on-Main, states in its report on the year's working that the factory was well employed last year. Sales abroad are being adversely affected by tariffs and import regulations. The report of the H. G. Farbwerk Mülheim vorm A. Leonhardt and Co. also states that sales last year were good, particularly in Germany. Owing to the depression in the German dyeing and printing industry the domestic demand is not good at present, and sales in most foreign markets have also fallen off considerably. One great difficulty is the shortage of various raw materials as a result of the Ruhr occupation.

Chemical Trader's Deed of Assignment

A MEETING of the creditors of F. W. Powell, chemical merchant, 85, Blackfriars Road, London, was held on Tuesday, June 19, Mr. P. S. Booth, of the Association of Manufacturing Chemists, presiding. The statement of affairs showed liabilities, £5,657 18s. 3d., and assets £1,403 12s. 7d., or a deficiency subject to costs of realisation of £4,254 5s. 8d. It was reported that the debtor had been in the chemical trade for about 38 years, but commenced trading on his own account in 1912. The business grew during the war until the turnover was about £100,000, but owing to the trade slump the business declined. Eventually it was resolved that a deed of assignment be executed to Mr. Rattenbury, with instructions to sell the assets for a sum sufficient to pay a composition of 7s. 6d. in the £, partly guaranteed. A committee of inspection was also appointed, consisting of Mr. Watlock (Stafford Allen and Sons), Mr. Cartelli and Mr. P. S. Booth.

Production of Methane from Water Gas

Practical Difficulties in the Process

DR. J. S. G. THOMAS, writing on "The Complete Gasification of Coal" in *Nature* of June 9, points out that the possibility of converting the comparatively large percentage of carbon monoxide in water gas into carbon dioxide or methane is by no means a novel proposition either from the scientific or industrial point of view. Sabatier and his co-workers showed, many years ago, that in the presence of nickel, cobalt, or palladium, carbon monoxide and hydrogen at 230–400° C. react to form methane and water, thus: $CO+3H_2=CH_4+H_2O$. This hydrogenation is subject to the important objection from the technical point of view that while hydrogen must be present in excess, an equal volume of hydrogen must be added to water gas to provide the mixture theoretically necessary. This hydrogen can be derived from water gas, and the net result is that the yield of methane is only about 15 per cent. of the total water gas employed. Sabatier pointed out that by passing water gas over nickel at 400–500° C. the following reaction occurred: $3CO+3H_2=CH_4+H_2O+C+CO_2$. The carbon deposited on the catalyst may, at the same temperature, be caused to react with steam to form a mixture of hydrogen, methane, and carbon dioxide, whereby the catalyst is regenerated for use in the first phase of the process. Sabatier further suggested that both phases might be combined by passing water gas and steam over a nickel catalyst at 400–500° C., when the following reaction occurs: $5CO+5H_2+H_2O=2CH_4+2H_2+3CO_2$.

Considerable Experience Necessary

These various reactions are summarised in a recent paper by Drs. E. F. Armstrong and T. P. Hilditch, read before the Royal Society, in which they direct attention to a reaction between carbon monoxide and hydrogen which has hitherto apparently escaped notice. They find that the action between equal volumes of carbon monoxide and hydrogen in the presence of nickel or a similar catalyst at temperatures below 300° is in the main represented by $2CO+2H_2=CO_2+CH_4$. It will be noticed that the gases carbon monoxide and hydrogen participate in the reaction very approximately in the relative proportions in which they are present in blue water gas (43 per cent. CO, 48 per cent. H_2). The reaction, though never complete, proceeds to a very considerable extent, and the authors consider the process may be of value in gas practice as the proportion of methane is 25 per cent. of the water gas decomposed, whereas by any of the other processes referred to the maximum possible yield is only 20 per cent.

The idea of the technical utilisation of the first reaction referred to above for the production of methane, and the application of the reversible reaction $CO+H_2O=CO_2+H_2$ for the production of hydrogen has recently been revived in connection with certain plants. It must be realised that few if any actual large-scale operations of this nature have hitherto been carried out. Considerable experience is necessary for the successful operation of catalytic plants operated at relatively high temperatures and dealing with the huge volume constituting a day's make of town's gas in the case of even one of the smaller gas companies. It is contemplated that the plant required would be of the same nature as that designed for the catalytic purification of gas from sulphur compounds which is in successful operation in the works of the South Metropolitan Gas Company. Operating charges would possibly amount to about ½d. per therm. It is questionable whether it would be technically feasible to remove the carbon dioxide produced. A suitable catalyst has been prepared, and small-scale operations in a plant capable of treating 200 c. ft. of gas per hour have been carried out. Large-scale operations constitute a much more difficult proposition.

Trade with Switzerland

MR. E. C. D. RAWLINS, who has been Commercial Secretary at Berne, will be in attendance at the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, from June 25 until June 29, and will be prepared, during that period, to interview United Kingdom firms interested in trade with Switzerland. Applications for interviews, which must be by appointment, should be addressed to the Department, and the reference 4780/T.G. quoted. As already announced, it has been decided for purposes of economy to close the post of Commercial Secretary at Berne as from June 30. Mr. Rawlins will shortly be transferred to another post.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

London, June 21, 1923.

THE chemical market has been more interesting during the past week, and a greater volume of business has been conducted on home account. Stocks of some products are appreciably light, and a firmer tendency is noted in same.

Export inquiry has been brisk, but little actual business has been placed owing to unremunerative prices offered.

General Chemicals

ACETONE is firmer and demand is broadening.

ACID ACETIC is scarce for spot, with good demand, and the price is inclined to go higher.

ACID CITRIC has been in slightly better request and an advance is not unlikely.

ACID FORMIC has been in good request and stocks are very light.

ACID OXALIC remains very slow, with price inclined to be easy.

ACID TARTARIC has met with slightly better demand and price is a shade firmer.

ACID LACTIC has met with moderate demand.

ARSENIC is slightly easier, with arrivals of foreign makes.

BARIUM CHLORIDE is slow, with price in buyer's favour.

BLEACHING POWDER has been in good request on home trade account.

CREAM OF TARTAR is firmer, and a further advance may be expected.

FORMALDEHYDE is again higher, with spot stocks practically depleted, and there is a keen demand for forward.

LEAD ACETATE is higher, with very little spot supply. The forward position is very firm.

POTASH CAUSTIC.—Demand slightly less, with consequent sales of realisation parcels.

POTASH CARBONATE is in better demand, but the price is without change.

POTASSIUM PERMANGANATE.—Without change.

POTASSIUM PRUSSIATE.—A further reduction is announced, with inquiry fairly good.

SODIUM ACETATE is very firm, and little supplies are available for the next few months.

SODIUM BICHROMATE is in good demand, and the price is controlled by English makers.

SODIUM NITRITE is in better demand, the price having a firming tendency.

SODIUM PRUSSIATE remains almost lifeless, but no further reduction in price has occurred.

SODIUM SULPHIDE. Very little business is passing, and the price is in buyer's favour.

ZINC OXIDE is slightly easier, with demand moderate.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID.—Moderate inquiry; prices readily obtained for good grades.

AMIDOL displays a slightly weaker tendency and continues in fair demand.

BROMIDES.—The break in the German exchange has resulted in cheap offers being made on this market; fair demand.

GUAIACOL CARBONATE.—The second hand stocks appear to be nearer exhaustion, and higher prices are likely.

HEXAMINE.—Weaker; good inquiry.

MILK SUGAR.—Cheap offers are reported on the basis of the present German exchange, but the demand is not keen.

PHENOLPHTHALEIN.—Forward prices are maintained; fair inquiry.

SODA BENZOATE.—Further advance owing to the firmer tendency in benzoic acid.

Coal Tar Intermediates

Business has been rather better during the past week, both on home and export account.

ALPHA NAPHTHOL continues very firm and fair orders have been placed

ALPHA NAPHTHYLAMINE.—Some small business is reported.

ANILINE OIL is quiet.

ANILINE SALT.—Export inquiries are in the market.

BENZIDINE BASE is featureless.

DINITROPHENOL.—Export inquiries have been received.

" H " ACID is steady.

NAPHTHIONIC ACID has been in request at recent values.

PARANITRANILINE is unchanged, with some export inquiry about.

" R " SALT.—Home buyers show more interest.

RESORCIN is quiet.

Coal Tar Products

The market in coal tar products generally is somewhat dull, and prices which have been maintaining a fairly high level are somewhat easier.

90% BENZOL is steady at 1s. 7d. per gallon on rails.

PURE BENZOL continues to be worth about 2s. 1d. per gallon on rails in the North and 2s. 4d. to 2s. 5d. per gallon in the South.

CREOSOTE OIL is unchanged at 8d. to 8¼d. per gallon on rails in the North and 8¾d. to 9d. per gallon in the South.

CRESYLIC ACID is easy at 2s. 1d. per gallon on rails for the Pale quality, 97/99%; while the Dark quality, 95/97%, is worth about 1s. 10d. per gallon on rails.

SOLVENT NAPHTHA has a poor demand, and is quoted at 1s. 4d. per gallon on rails.

HEAVY NAPHTHA is also quiet at 1s. 6d. per gallon.

NAPHTHALENES are distinctly weaker, the lower qualities being worth from £6 10s. to £7 per ton, while the better qualities are quoted at £9 10s. to £10 10s. per ton.

PITCH is in better demand for autumn delivery, and prices have an upward tendency. To-day's quotations are:—125s. to 130s. f.o.b. London; 125s. f.o.b. East Coast; 120s. f.o.b. West Coast.

Sulphate of Ammonia

Trade is quiet and the demand both for prompt and forward delivery is small.

Current Market Prices on following pages.

Physical and Chemical Survey of Coal Resources

ONE of the main functions of the Fuel Research Board is a survey and classification of the coal seams in the various mining districts by means of chemical and physical tests in the laboratory, supplemented where desirable by large scale tests at the Fuel Research Station, East Greenwich, or elsewhere. The Board consider that the best way to carry out this work is by means of local committees, the personnel of which would include colliery owners, managers, representatives of the Fuel Research Board and of the Geological Survey of Great Britain, as well as of outside scientific interests. Each committee would be charged with the duty of superintending the work of the survey in a coal mining area, and in this way the survey would become from the commencement of practical value, since local knowledge and experience would be made available, and the selection of seams would be decided by those most likely to estimate correctly the relative importance of the problems to be solved. The seams selected would undergo physical and chemical examination by the local experts, after which a final selection would be made of those likely to justify experiments on a practical scale to test their suitability for particular uses or methods of treatment.

The first of these committees has now been actively at work in the Lancashire and Cheshire area for nearly eighteen months, and the Board have recently appointed a committee to deal with the South Yorkshire area. The committee is as follows:—Mr. J. Brass, Mr. Robert Clive (Hon. Secretary), Mr. H. Danby, representing the South Yorkshire Coal Trade Association; Lieut.-Col. H. Rhodes, representing the Midland Institute of Mining, Civil and Mechanical Engineers; Professor R. V. Wheeler; Dr. C. H. Lander, Director of Fuel Research, representing the Fuel Research Board; Dr. Walcot Gibson, representing the Geological Survey of Great Britain.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	121	0	0	to	125	0	0
Acid, Acetic, glacial, 99–100%	ton	69	0	0	to	70	0	0
Acetic, 80% pure	ton	50	0	0	to	51	0	0
Acetic, 40% pure	ton	25	0	0	to	26	0	0
Arsenic, liquid, 2000 s.g.	ton	88	0	0	to	90	0	0
Boric, commercial	ton	50	0	0	to	55	0	0
Carbolic, cryst. 39–40%	lb.	0	1	8	to	0	1	9
Citric	lb.	0	1	10	to	0	1	10½
Formic, 80%	ton	50	0	0	to	51	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	27	0	0	to	28	0	0
Oxalic	lb.	0	0	6½	to	0	0	6¾
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	1	9	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	5	to	0	1	5½
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	8	10	0	to	9	0	0
Sulphate, 17–18%	ton	10	10	0	to	11	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	32	15	0		—		
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	35	0	0	to	37	10	0
Nitrate (pure)	ton	35	0	0	to	40	0	0
Phosphate	ton	68	0	0	to	70	0	0
Sulphocyanide, commercial 90%	lb.	0	1	1	to	0	1	3
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white powdered	ton	73	0	0	to	75	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	16	0	0	to	16	10	0
Nitrate	ton	33	0	0	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	10	0	to	11	0	0
Borax crystals	ton	27	0	0	to	—		
Calcium acetate, Brown	ton	11	10	0	to	12	0	0
Grey	ton	19	15	0	to	20	0	0
Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	100	0	0	to	105	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	27	0	0	to	28	0	0
Cream Tartar, 98–100%	ton	97	10	0	to	100	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	92	10	0	to	95	0	0
Formusol (Rongalite)	lb.	0	2	1	to	0	2	2
Glauber salts, commercial	ton	5	0	0	to	5	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal	0	2	2	to	0	2	3
Iron perchloride	ton	28	0	0	to	30	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	43	0	0	to	45	0	0
Carbonate (White Lead)	ton	45	0	0	to	48	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	39	0	0	to	40	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	4	7	6	to	4	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	6	10	0	to	7	0	0
Sulphate (Druggists')	ton	10	0	0	to	11	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	50	0	0	to	55	0	0
Methyl acetone	ton	78	0	0	to	80	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	39	0	0	to	40	0	0
Ammonium sulphate, double salt	ton	39	0	0	to	40	0	0
Potash, Caustic	ton	35	0	0	to	36	0	0
Potassium bichromate	lb.	0	0	5½	to	0	0	6
Carbonate, 90%	ton	31	0	0	to	32	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	4	to	0	0	4½
Metabisulphite, 50–52%	ton	75	0	0	to	80	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	10½	to	0	0	11
Prussiate, red	lb.	0	3	3	to	0	3	6
Prussiate, yellow	lb.	0	1	4½	to	0	1	5
Sulphate, 90%	ton	10	10	0	to	11	0	0
Salammoniac, firsts	cwt.	3	3	0	to	—		
Seconds	cwt.	3	0	0	to	—		
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	0	0	4¾
Bisulphite, 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3½	to	0	0	3¾
Caustic, 70%	ton	19	10	0	to	20	0	0
Caustic, 76%	ton	20	10	0	to	21	0	0
Hydrosulphite, powder	lb.	0	1	5	to	0	1	6
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	27	10	0	to	28	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	1	0	to	0	1	1
Prussiate	lb.	0	0	7¾	to	0	0	8
Sulphide, crystals	ton	10	10	0	to	11	0	0
Sulphide, solid, 60–62 %	ton	16	10	0	to	17	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	10	0	to	12	10	0
Roll	ton	11	0	0	to	12	0	0
Tartar emetic	lb.	0	1	2	to	0	1	3
Tin perchloride, 33%	lb.	0	1	1	to	0	1	2
Perchloride, solid	lb.	0	1	3	to	0	1	4
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	50	0	0	to	52	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	16	0	0	to	17	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	3	to	0	3	6
Acetanilid	lb.	0	1	6	to	0	1	9
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	3	to	0	2	9
Salicylic, B.P.	lb.	0	2	2	to	0	2	6
Tannic, leviss.	lb.	0	3	2	to	0	3	4
Amidol	lb.	0	7	9	to	0	8	3
Amidopyrin	lb.	0	13	0	to	0	13	3
Ammon ichthosulphonate	lb	0	1	11	to	0	2	2
Barbitone	lb.	1	1	0	to	1	3	0
Beta naphthol resublimed	lb.	0	1	9	to	0	2	0
Bromide of ammonia	lb.	0	0	8	to	0	0	9
Potash	lb.	0	0	7	to	0	0	8
Soda	lb.	0	0	7½	to	0	0	8½
Caffeine, pure	lb.	0	11	0	to	0	11	6
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	10	to	0	2	0
Calomel	lb.	0	4	9	to	0	5	0
Chloral hydrate	lb.	0	3	10½	to	0	4	0
Cocaine alkaloid	oz.	0	18	0	to	0	18	6
Hydrochloride	oz.	0	14	9	to	0	15	0
Corrosive sublimate	lb.	0	4	3	to	0	4	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	1	8	to	0	1	9
B.P. (75–80% eucalyptol)	lb.	0	1	9	to	0	1	10
Guaiacol carbonate	lb.	0	8	9	to	0	9	0
Liquid	lb.	0	9	6	to	0	10	0
Pure crystals	lb.	0	10	3	to	0	10	6
Hexamine	lb.	0	3	1	to	0	4	1
Hydroquinone	lb.	0	3	6	to	0	3	9
Lanoline anhydrous	lb.	0	0	7	to	0	0	7½
Lecithin ex ovo	lb.	0	17	6	to	0	19	0
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	5	to	0	2	8
Metol	lb.	0	10	6	to	0	11	6
Milk sugar	cwt.	4	7	6	to	4	10	0
Paraldehyde	lb.	0	1	6	to	0	1	9
Phenacetin	lb.	0	6	4	to	0	6	6
Phenazone	lb.	0	7	6	to	0	7	9
Phenolphthalein	lb.	0	6	6	to	0	6	9
Potassium sulpho guaiacolate	lb.	0	5	0	to	0	5	3
Quinine sulphate, B.P.	oz.	0	2	3		—		

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	6	to	0	5	9
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	9	to	0	3	0
Salol	lb.	0	2	9	to	0	3	0
Soda Benzoate	lb.	0	2	6	to	0	2	9
Sulphonal	lb.	0	14	6	to	0	15	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	10	6	to	0	11	0
Soda salicylate	lb.	0	7	9	to	0	8	3
Vanillin	lb.	1	3	0	to	1	4	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	0	to	0	2	3
Refined	lb.	0	2	6	to	0	2	9
Alphanaphthylamine	lb.	0	1	6	to	0	1	7
Aniline oil, drums extra	lb.	0	0	9	to	0	0	9½
Salts	lb.	0	0	9½	to	0	0	10
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	0	to	0	3	3
Benzidine, base	lb.	0	4	9	to	0	5	0
Sulphate	lb.	0	3	9	to	0	4	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	4	to	0	1	5
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	3	0	to	0	3	3
Diphenylamine	lb.	0	3	6	to	0	3	9
H-Acid	lb.	0	5	0	to	0	5	3
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	7	6	to	0	8	6
Naphthionic acid, crude	lb.	0	2	3	to	0	2	6
Naphthionate of Soda	lb.	0	2	6	to	0	2	9
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Nevill Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	2	7	to	0	2	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	9	to	0	6	3
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	10	to	0	0	11
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	c.i.f. 1/10 spot	0	2	0
Bay		0	12	0
Bergamot	easier	0	12	0
Cajaput		0	3	9
Camphor, white	harder, per cwt.	4	0	0
Brown	,, ,,	3	15	0
Cassia	dearer and very scarce. No c.i.f. offers; spot	0	11	6
Cedarwood		0	1	4½
Citronella (Ceylon)	dearer and scarce	0	3	9
(Java)		0	4	0
Clove		0	6	9
Eucalyptus	dearer and scarce	0	1	9
Geranium Bourbon		1	10	0
Lavender		0	12	6
Lavender spike	harder	0	3	0
Lemon	,,	0	3	0
Lemongrass	per oz.	0	0	2½
Lime (distilled)		0	4	0
Orange sweet (Sicilian)		0	13	6
(West Indian)		0	10	6
Palmarosa	scarce	0	19	0
Peppermint (American)		0	13	0
Mint (dementholised Japanese)		0	6	9
Patchouli		1	12	0
Otto of Rose	per oz.	1	4	0
Rosemary		0	1	8
Sandalwood		1	6	0
Sassafras		0	5	3
Thyme	2/6 to	0	8	0
Synthetics.				
Benzyl acetate		0	3	0
Benzoate		0	3	0
Citral		0	10	0
Coumarine		0	17	6
Heliotropine		0	7	6
Ionone		1	5	0
Linalyl acetate		1	2	6
Methyl salicylate		0	2	6
Musk xylol		0	10	6
Terpeniol		0	3	1

Hamburg Wax Market

Hamburg, June 9.

Business with the interior still remains quiet, and the turnover abroad is satisfactory. The market is in general firm. Wholesale wax is much in demand and prices continue to rise. The price is M. 2,000 per K. ex works for whole wagonloads, M. 2,100 for smaller quantities. The price of carnauba wax fell slightly, viz., 96s. to 97s. per cwt. was demanded for fat grey quality and 97s. to 98s. for courant grey. Japan wax is firm; for spot goods of the first three marks the price asked was 75s. per cwt., whereas from Japan the price asked was 78s. There is a brisk business in bees-wax for abroad, chiefly bleached. On the other hand, the use of it in the interior continues to decline owing to the high price. The following prices are quoted:—

West African	94/– to 102/– per cwt.
East African	102/– to 107/– per cwt.

and for the better qualities as much as 125s. was paid. Business in ceresin is quiet: natural yellow of ordinary quality about 54/56° C. at $11 to $11.50, white from $12 to $12.50, natural yellow ozokerit-ceresin about 62/64° C. from $32.25 to $33, white ditto $35.75 to $36. All the above prices were for cash on duty-unpaid goods (except wholesale wax). The duty is as follows:—

Carnauba wax	M. 1,190 per K.
Bees-wax	M. 1,190 per K.
Paraffin	M. 1,190 per K.
Japan wax	M. 1,785 per K.

There was a constant demand for paraffin, but the market remained quiet. The quotations included: Prima White American cake paraffin, 50/52° C., $7.90 to $8.25; White American flake paraffin, 50/52° C., $7.25 to $7.50; White Galiz cake paraffin, 50/52° C., $7.70 to $8 per 100 K. c.i.f. Hamburg.

Chemical Trade Conditions in Hamburg

In the report of the chemical markets in Hamburg, circulated by Schütz and Co., there is a long introduction on the present political situation, from which the principal fact emerges that business conditions there are almost impossible owing to the exchange difficulties and the consequent rapidly rising prices which totally preclude all forward business. The mark is now the worst of all the foreign exchanges, except the Russian rouble. The price of the dollar is now the political barometer.

It is not surprising to find the majority of prices quoted in pounds sterling. The following market prices are of interest:—

Borax.—Crystals, £28 per 1,000 kg.; powdered, £31 per 1,000 kg.

Boric Acid.—Inland, crystals, 23,000 m. per 1,000 kg.; powdered, 23,500 m. per 1,000 kg. Abroad, £46 and £52 respectively.

Potassium Nitrate.—"We are buyers, and ask for quotations."

Sodium Benzoate.—Inland, powdered, 75,000 m. per kg.; granulated, 73,000 m. per kg. Abroad, 2s. 2d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, June 20, 1923.

BUSINESS has been quiet during the past week and there is nothing of importance to record.

Industrial Chemicals

ACID ACETIC.—Glacial, 98/100%, £61 to £70 per ton; 80% pure, £49 to £50 per ton; 80% technical, £46 to £48 per ton, c.i.f. U.K. ports duty free.

ACID BORACIC.—Crystal or granulated, £50 per ton; powdered, £52 per ton, carriage paid U.K. stations.

ACID CARBOLIC ICE CRYSTALS.—In little demand. Now quoted 1s. 4d. per lb.

ACID FORMIC 80%.—Unchanged at about £50 per ton, ex wharf.

ACID HYDROCHLORIC.—6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—Quoted £24 per ton, ex station, full wagon loads.

ACID OXALIC.—Unchanged at about 6¼d. per lb.

ACID SULPHURIC.—144°, £3 15s. per ton; 168°, £7 per ton; ex works, full wagon loads. Dearsenicated quality, 20s. per ton, extra.

ACID TARTARIC.—Price about 1s. 3¾d. per lb.

ALUM, LUMP POTASH.—About £10 per ton, ex wharf, early delivery. Spot lots about £11 10s. per ton, ex store.

ALUMINA SULPHATE 17/18% about £10 10s. per ton; 14/15%, £7 10s. per ton, ex wharf, early delivery.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 5½d. per lb., ex station.

AMMONIA CARBONATE.—Lump 4d. per lb.; ground 4¼d. per lb., delivered.

AMMONIA LIQUID 880°.—Unchanged at about 3½d. per lb., ex station.

AMMONIA MURIATE.—Galvanizers Grey quality, £31 to £32 per ton; fine white crystals about £24 per ton, ex wharf.

AMMONIA SULPHATE.—25¼%, £15 10s. per ton; 25¾%, neutral, £16 13s. per ton, ex works. June delivery.

ARSENIC, WHITE POWDERED.—Inclined to be higher at £77 per ton, ex wharf.

BARIUM CHLORIDE, 98/100%.—Continental material about £12 to £13 per ton, c.i.f. U.K.

BARYTES.—Fine white English material unchanged at £5 5s. per ton, ex works.

BLEACHING POWDER.—£11 7s. 6d. per ton, ex station, spot delivery. Contracts 20s. per ton less.

BORAX, GRANULATED.—£26 10s. per ton; crystal, £27 per ton; powdered, £28 per ton, ex U.K. stations.

CALCIUM CHLORIDE.—English make, £5 12s. 6d. per ton, ex quay or station. Continental make about £4 per ton, c.i.f. U.K.

COPPERAS (GREEN).—Price about £2 5s. per ton, f.o.b. U.K. port.

FORMALDEHYDE, 40%.—£92 to £93 per ton now asked for spot material, which is scarce. Quoted £86 per ton, ex wharf, early delivery.

GLAUBER SALTS.—Fine white crystals, £3 15s. per ton, ex store. Offered from Continent at £2 15s. per ton, c.i.f. U.K.

LEAD, RED.—English make, £41 per ton, carriage paid U.K. stations. Continental about £37 per ton, ex store. Offered at £33 10s. per ton, c.i.f. U.K. for prompt shipment.

LEAD ACETATE.—White crystals about £41 per ton, c.i.f. U.K. Spot lots quoted £44 per ton.

MAGNESITE, GROUND CALCINED.—English ground about £8 5s. to £8 10s. per ton. Continental, £7 10s. per ton, c.i.f. U.K.

MAGNESIUM CHLORIDE.—Now on offer at £1 12s. 6d. per ton, c.i.f. U.K. Spot lots £2 15s. per ton, ex store.

MAGNESIUM SULPHATE (Epsom Salts).—Commercial crystals, £7 per ton; B.P. quality, £8 to £8 5s. per ton, ex station.

POTASH, CAUSTIC, 88/92%.—Offered at £29 10s. per ton, ex wharf, early delivery. Spot lots about £32 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—Spot lots about £32 10s. per ton; 90/92%, £27 per ton, ex store.

POTASSIUM CHLORATE.—Crystals or powdered, 3d. per lb., ex store.

POTASSIUM PERMANGANATE.—B.P. crystals about 10¾d. per lb., ex store.

POTASSIUM PRUSSIATE (Yellow).—Quoted 1s. 4d. per lb., ex wharf.

SODA CAUSTIC.—76/77%, £21 7s. 6d. per ton; 70/72%, £19 17s. 6d. per ton; 60/62%, broken, £21 2s. 6d. per ton; 98/99%, powdered, £24 15s. per ton, all ex station, spot delivery.

SODIUM ACETATE.—Unchanged at about £25 10s. per ton, ex wharf, early delivery.

SODIUM BICARBONATE.—Refined re-crystallised quality £10 10s, per ton, ex quay. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4½d. per lb. delivered.

SODIUM CARBONATE.—Soda Crystals, £5 to £5 5s. per ton, ex quay or station. Alkali, 58%, £8 16s. per ton, ex quay or station.

SODA HYPOSULPHITE.—Commercial crystals offered at £8 5s. per ton, c.i.f. U.K. Spot lots about £9 15s. per ton, ex wharf. Pea Crystals quoted £15 10s. per ton, ex store.

SODA, NITRATE.—Refined 96/98% quality, £13 7s. 6d. per ton, f.o.r. or f.o.b. U.K.

SODIUM PRUSSIATE (YELLOW).—Unchanged at 7d. per lb., c.i.f. U.K.

SODIUM SULPHATE (SALTCAKE 95%).—£4 per ton ex station for home consumption. Higher prices for export.

SODIUM SULPHIDE, 60/62%.—Offered from continent at £12 per ton, c.i.f. U.K.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

TIN CRYSTALS.—Unchanged at 1s. 4d. per lb.

ZINC CHLORIDE, 98/100%.—Solid about £22 per ton, c.i.f. U.K.

ZINC SULPHATE.—Commercial crystals offered at £11 per ton, ex store.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ACETANILIDE.—Good export inquiry. Price 1s. 10d. per lb., 100% basis, f.o.b.

ANILINE OIL.—Export inquiries. Price quoted 11½d. per lb., f.o.b. U.K. port, drums included.

BENZIDINE BASE.—Large export inquiry. Price quoted 6s. 6d. per lb., 100% basis.

BETA OXY NAPHTHOIC ACID.—Supplies are offered at 10s. per lb., delivered.

CHROMOTROPE ACID.—Export inquiry. Price quoted 9s. 9d. per lb., 100% basis, f.o.b.

CLEVES ACID.—Export inquiry. Price 3s. 8d. per lb., 100% basis, f.o.b.

DICHLORBENZENE.—Home inquiry. Price 8d. per lb., delivered, drums returnable.

DIMENTHYLANILINE.—Various export inquiries. Price quoted 3s. 1d. per lb., f.o.b. U.K. port.

"H" ACID.—Good export demand. Price quoted 5s. per lb., 100% basis, f.o.b.

METANITRANILINE.—Small export inquiry. Price quoted 2s. 6d. per lb., 100% basis.

PARADI CHLORBENZENE.—Small home inquiry. Price quoted 10½d. per lb., delivered.

"R" SALT.—Home inquiry. Price quoted 2s. 9d. per lb., 100% basis.

SCHAEFFER SALT.—Home inquiry. Price quoted 4s. 6d. per lb., 100% basis.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, June 21, 1923.

The chemical market here still shows little sign of recovery from the sluggishness into which it has fallen during the past few weeks. Business is quiet, and on the whole transactions relate chiefly to small parcels, buyers displaying little anxiety to depart from their hand-to-mouth scale of operations. As before, a good proportion of the business that is being done is in respect of a somewhat narrow range of products. Prices generally are being well maintained at recent levels.

Heavy Chemicals

A good home and foreign demand for caustic soda continues to be reported, and prices to domestic consumers are steady at from £19 for 60 per cent. to £21 10s. per ton for 76–77 per cent. material. Bleaching powder also meets with a steady inquiry from the home trade, and also for shipment, with prices to the former firm at £11 7s. 6d. per ton. Soda crystals are unchanged at £5 5s. per ton delivered, with business on the quiet side. Saltcake is in steady demand, both on home and foreign account, with prices steady at round £4 10s. per ton. Sodium sulphide is still a dull section at £14 10s. per ton for 60–65 per cent. concentrated solid and £8 10s. per ton for crystals. Glauber salts are quiet but steady at £4 per ton. Bicarbonate of soda meets with a moderate demand at the unchanged quotation of £10 10s. per ton delivered to home users. Alkali is still active for both branches of trade, the price to home users is firm at £7 12s. 6d. per ton for 58 per cent. material. Hyposulphite of soda continues to attract little attention, photographic crystals, however, are steady at £15 per ton, with commercial a shade easier at £10. Nitrite of soda is still scarce and firm at £27 per ton. Phosphate of soda is quiet and rather weaker at £14 to £14 10s. per ton. Chlorate of soda is meeting with a fairly active demand at 2¾d. per lb. Prussiate of soda keeps quiet, though prices are steady at 7¼d. per lb. Bichromate of soda is firm and in moderate inquiry at 4¼d. per lb. Acetate of soda is in quietly steady demand at £25 per ton.

Caustic potash is rather less active, and prices show an easier tendency at £32 per ton for 88–90 per cent. material. Carbonate of potash is unchanged at £32 per ton for 96–98 per cent. and £29 for 90–92 per cent. Bichromate of potash is firm at 5¾d. per lb., a fair amount of business being put through. Yellow prussiate of potash continues quiet though without further change in prices, which are still round 1s. 3½d. per lb. Chlorate of potash is steady and in fair demand at 3d. per lb. Permanganate of potash is firmly maintained at 9¾d. to 10d. per lb.

Sulphate of copper is firm at £26 to £26 10s. per ton, f.o.b., with a quietly steady demand for shipment. Arsenic continues in short supply, with prices steady at about £75 per ton for white powdered, Cornish makes; foreign brands, however, being on offer at much lower prices. Commercial Epsom salts, English make, meet with fair inquiry at £5 10s. to £6 per ton, with foreign makes quoted at below these figures; magnesium sulphate, B.P., is easier at £6 10s. Acetate of lime is scarce and firm at £22 for grey and £12 per ton for brown. Nitrate of lead is quoted at £42 to £43 per ton. Sugar of lead is still in short supply at £41 to £42 per ton, both for white and brown.

Both tartaric and citric acids are finding a fairly good market. Tartaric is firm at 1s. 3½d. per lb., whilst citric, B.P. crystals, is stronger at 1s. 8½d. per lb. Oxalic acid keeps very quiet at 6d. to 6¼d. per lb. Acetic acid is a very strong section; glacial is quoted at round £70 and 80 per cent. technical at about £48 per ton.

Coal-tar products generally are a little more active, and prices are steadier. Pitch is quiet, but prices are maintained at £5 10s. to £6 per ton, f.o.b. Supplies of carbolic acid crystals are not excessive, and the price is firm at 1s. 5d. to 1s. 6d. per lb.; crude is still quoted at 3s. 6d. per gallon. Benzole is moderately active at 1s. 7d. per gallon. Solvent naphtha is firmer on a rather improved export inquiry at 1s. 7d. per gallon. Creosote oil is steady at 9d. per gallon. Naphthalines are in good demand and quotations are firm; flake is quoted at round £20, and crude at £7 to £13.

The Nitrate Market

According to the fortnightly circular, dated June 19, of Aikman (London), Ltd., the arrivals amount to about 13,000 tons, and about 5,000 tons are due during the next fortnight. Prices on the spot are quoted about £11 17s. 6d. to £12 7s. 6d. per ton, and for next spring £12 10s. to £13 per ton delivered according to market. The heavy buying of f.o.b. has continued and the Producers' Association have sold during the fortnight about 280,000 tons, making their total sales for shipment after July 1, 1923, about 855,000 English tons, of which 150,000 tons July, 172,000 each August-September, 197,000 October, 128,000 November and 36,000 tons for December shipment. All quantities offered for shipment up to first half November having been disposed of, the cheapest price at which f.o.b. can now be obtained is at 20s. 7d. per metric quintal for shipment up to end November. A limited quantity has now been offered for sale January-April, 1924, at the official scale of prices, viz., 21s. per metric quintal. European deliveries for first half June were about 47,500 tons, against 42,500 tons last year. The shipment figures (in tons) for the first fortnight of June are:

	1923.	1922.	1921.	1914.
To Europe and Egypt.....	7,000	2,000	19,000	50,000
„ United States	27,000	15,000	33,000	10,000
„ Japan and other countries .	9,000	4,000	—	2,000

The price of German synthetic nitrogen products has been subject to two further rises during the fortnight, closing at 26,370 m. for nitrate of soda, 22,120 m. for sulphate of ammonia, and 19,860 m. for cyanamide, all per unit of nitrogen per 100 kilos.

Industrial Physical Research in America

In his recent presidential address to the Institute of Physics Sir J. J. Thomson gave some account of the work he had seen during his recent visit to America in the research departments of some of the great manufacturing firms. These laboratories, he said, were established in the face of considerable opposition, but now the universal opinion appeared to be that the research department was one of the most profitable in manufacturing concerns, and however great the necessity for economy its cost would be the last to be reduced. The scale of these laboratories was far greater than anything we had in this country and much of the work carried out was not merely what might be called development work but fundamental scientific work, worthy of a University laboratory. On the other hand, the American Universities did not seem designed to produce a large number of men qualified to take up advanced research work. For example, few of the science students had the necessary equipment in mathematics, and the stern training which a good Honours man in a great English University had to go through appeared to be unknown. The system was doubtless good for the average man, but a successful research institute required something more than the average man; it needed men with high scientific knowledge. In this regard this country had a distinct advantage that would sorely be needed if we were to hold our own in competition.

The Oxidation of Phosphorus

At a meeting of the Royal Society of Edinburgh, held in Edinburgh on Monday, a paper was read by Dr. Elizabeth Gilchrist on "The Slow Oxidation of Phosphorus." She said that the glowing of phosphorus was due to a slow oxidation which took place when phosphorus was exposed to air. The glow disappeared in high pressures of oxygen. This curious fact, which was a contradiction of the law of mass action, had puzzled chemists for more than a hundred years. Dr. Gilchrist illustrated by several experiments the effect on the glow of different pressures of oxygen, and showed that some gases act as poisons while others act as promoters of the glow. She considered that the reaction took place in two stages; phosphorus trioxide being produced in the first stage without glowing, and phosphorus pentoxide in the second stage with glowing. The hindering effect was ascribed to the production of an anticatalyst, which might probably consist of negatively charged molecules.

Company News

ASBESTOS CORPORATION OF CANADA.—The usual quarterly dividends have been declared.

NEW TAMARUGAL NITRATE CO.—An interim dividend is announced at the rate of 10 per cent., or 2s. per share, less income tax.

AMERICAN CYANAMID CO.—Dividends at the rate of 1½ per cent. on the preferred stock and 1 per cent. on the common stock are payable on July 2, to holders of record June 25.

THE NEW TRANSVAAL CHEMICAL CO., LTD.—The transfer books were closed on Wednesday, June 20, and will remain closed until June 30.

WILLIAM GOSSAGE AND SONS, LTD.—The transfer books of the 6½ per cent. cumulative preference shares are closed until July 1, for the purpose of preparing and issuing dividend warrants due on that date.

THE BRITISH COTTON AND WOOL DYERS' ASSOCIATION, LTD.—The transfer registers in respect of the first mortgage debenture stock of the Association are closed until July 1, for the preparation of interest warrants.

YORKSHIRE DYEWARE AND CHEMICAL CO.—At the annual meeting held in Leeds on Tuesday last a final dividend was declared at the rate of 12½ per cent., making 15 per cent. for the twelve months, and also a special bonus of 1s. 6d. per share.

THE UNITED TURKEY RED CO., LTD.—The 4 per cent. first cum. preference share transfer books will be closed from June 29 to July 6, both days inclusive, for the preparation of warrants for the half-year's preference dividend, payable on July 6.

THE BROKEN HILL PROPRIETARY CO., LTD.—Coupon No. 18 of the 6 per cent. debentures will be paid on and after Monday, July 2, at the Commonwealth Bank of Australia, New Broad Street, London, E.C. Coupons must be left at the Bank three clear days previous to payment, for examination.

BENZOL AND BY-PRODUCTS, LTD.—At a meeting of the shareholders held on Tuesday, June 19, the resolutions for writing down the ordinary shares from £1 to 10s. each, for reducing the fixed interest rate on the preference shares from 10 per cent. to 6 per cent. with participation rights, and cancelling the preference shareholders' claim to payment of arrears, were carried, but not by the required majority. Consequently, it was necessary to take a poll, and the result of this will be announced later on.

DE BEERS CONSOLIDATED MINES.—A cable from the head office at Kimberley states that the board of directors has declared a dividend on the preference shares of 25s. per share, less union dividend tax of 7½ per cent. This is in payment of the balance of the accumulated preference dividends in arrear and in full payment of the dividend due to preference shareholders for the current year ending June 30, 1923, and will be payable to preference shareholders registered at the close of business on that date. The dividend will also be subject to British income-tax at a rate to be agreed with the Inland Revenue authorities.

ZINC CORPORATION, LTD.—The directors, in their report for 1922, state that the profit for the year was £176,354, to which is added £26,159, appropriations for mine development and new plant at December 31, 1921, unexpended and now written back. After deducting income-tax and corporation profits tax, preference dividends paid on January 2, 1923, appropriations for mine development, etc., and depreciation of machinery, plant, and equipment, there remains £94,094, to which is added £17,978 brought forward. After allowing for preference dividends paid July 2, 1923, participating dividend payable on the same date, and directors' percentage on profits, there remains a balance of £41,486.

INTERNATIONAL NICKEL CO.—The report for the year to March 31 last states that the net operating income (consolidated) was $847,089. After providing $394,728 for depreciation and depletion and $389,191 for expense and maintenance of shut-down mines and plants, the profits (consolidated) were $48,170. Balance-sheet shows $2,404,403 was written off the property account. Four dividends of 1½ per cent. each on the preferred stock have been paid during the year. The net earnings for the year of the International Nickel Co., of New Jersey, inclusive of dividends received from its subsidiaries, were in excess of the amount so distributed. No dividends were paid on the common stock.

"SHELL" TRANSPORT AND TRADING CO.—The net profit for the year 1922, after deducting new issue expenses (£164,813), stamp duty (£100,000), etc., amounted to £4,633,159 (against £5,487,421 for 1921), to which is added £2,069,596 brought forward. After deducting the first and second preference dividends and the interim ordinary dividend, the balance remaining is £4,449,699. The directors propose a further and final dividend for the year on the ordinary shares of 2s. 6d. per share, making 22½ per cent. for the year (against 27½ per cent.), free of tax, leaving £2,029,056 to be carried forward, subject to provision for excess profits duties. The directors are satisfied that ample provision for depreciation has been made over the numerous companies in which they are interested.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. No.
South Africa...	Linseed oil, white lead, soap ..	789
Belgium	Fish glues, glucose, etc.	791
France.....	Industrial oils, sulphate of copper	796
Australia.....	Machinery and apparatus for the manufacture of pharmaceutical preparations	11446/ED/CC/2

Tariff Changes

SPAIN.—It is announced that all *ad valorem* duties are to be abolished and in place duty will be assessed on weight.

GREECE.—The import of sulphur and sulphate of copper is prohibited as from May 25 last. The import duty on superphosphate manures has also been slightly modified.

Contract Open

Tenders are invited for the following articles. The latest dates for receiving tenders are, when available, given in parentheses.

BRITISH INDIA (July 13).—Glycerine and ferro-silicon. Tender forms are available on application to the Director-General, India Store Department, Branch No. 10, Belvedere Road, Lambeth, S.E.1.

Chemical Plant for Australia

H.M. SENIOR TRADE COMMISSIONER in Australia (Mr. S. W. B McGregor) reports that a Melbourne firm of manufacturing chemists specialising in the production of galenicals and other pharmaceutical preparations, are desirous of receiving particulars from British manufacturers of any machinery, appliance, apparatus, etc., used in the manufacture of such products in a wholesale way, such as percolators (mechanical and otherwise), evaporators, boiling pans, filters (*not* water filters). They are particularly interested in any plant that would be of service in the manufacture of extract of glycyrrhizae and extract of cascara on a large scale. British firms interested in this inquiry can obtain the name and address of the inquirers upon application to the Department of Overseas Trade (Room 52).

Swiss and German Dyestuff Agreement

THE Swiss dyestuff manufacturers, the Chemische Fabrik von Durand and Huguenin of Basle, have appointed to their directorate Dr. Krekeler of the German Bayer Co, Leverkusen, and also the managing director of the French Cie Nationale de Matierès Colourantes. This step is supposed to indicate that the Swiss firm is about to become a party to the agreement between the German I.G. and the French colour companies drawn up last year, and future developments will be awaited with interest.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BISSELL, Mr. S. S. J. (trading as WOODBROOK DRUG CO.), 65, Church Lane, Wolverhampton, manufacturing druggist. (C.C., 23/6/23.) £47 15s. 4d. May 7.

BEVAN, Mr. M. L., Morriston, pharmacist. (C.C., 23/6/23.) £23 4s. 7d. May 7.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BELL (John) AND CROYDEN, LTD., London, W., chemical manufacturers. (M., 23/6/23.) Registered June 9, £20,000 second debentures (filed under section 93 (3) of the Companies (Consolidation) Act, 1908), present issue £10,000; general charge (subject to £125,000 debenture stock dated August 25, 1922). *£125,000. September 1, 1922.

BRIERLEY SANDERS, LTD., Oldham, chemists. (M., 23/6/23.) Registered June 6, mortgage securing £420 and further advances, to Huddersfield Building Society, charged on 4, Barker Street, Oldham.

CAUCASIAN MANGANESE SYNDICATE, LTD., Liverpool. (M., 23/6/23.) Registered June 6, £18,000 debentures including £16,000 already registered (filed under section 93 (3) of the Companies (Consslidation) Act, 1908), present issue £200; general charge. *£10,700. June 21, 1922.

London Gazette

Bankruptcy Information

BURLIN, Adolph Lionel, 297, Seven Sisters Road, Finsbury Park, London, consulting chemist. (R.O., 23/6/23.) Receiving order, June 11. Creditor's petition. First meeting, June 28, 11.30 a.m.; and public examination, October 2, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

MUSGRAVE, Herbert, carrying on business under the style of JOHN MUSGRAVE, at Grove Dye Works, Meanwood Road, Headingley, Leeds, dyer. First meeting, June 25, 11.30 a.m., Official Receiver's Offices, 24, Bond Street, Leeds. Public examination, July 10, 11 a.m., County Court House, Leeds.

Edinburgh Gazette

OZOBRITE CO. (Thomas ROBERTSON and Mrs. Sarah ROBERTSON, trading as), chemical manufacturers, Greenock. (B.P., E.G., 23/6/23.) Meeting of the creditors to be held at the office of the trustee, Mr. Robert Macfarlan, 149, West George Street, Glasgow, on Tuesday, July 3, at 12 noon, to consider application to be made for the trustee's discharge.

New Companies Registered

BRITISH SEPARATORS, LTD., 14, Queen Victoria Street, London, E.C. To manufacture and deal in plant, machinery, tools and appliances of all kinds, including centrifugal separators, purifiers, filters, etc. Nominal capital, £5,000 in £1 shares.

FOX INSTRUMENT CO., LTD., 55, Clayton Street, Newcastle-on-Tyne. Manufacturers of and dealers in pyrometers, thermometers, barometers, recorders and scientific appliances. Nominal capital, £8,000 in £5 shares (800 cumulative preference and 800 ordinary).

J. HAMILTON AND CO., LTD., Soapwork Lane, Dundee. Analytical, hydrological and manufacturing chemists, dyers, etc. Nominal capital, £1,000 in £1 shares.

RELIANCE TRADING AND MANUFACTURING CORPORATION, LTD., Prince's Street, Queen Square, Bath. Manufacturers of soap, glycerine, soap powders, etc. Nominal capital, £200 in £1 shares (100 cumulative preference).

HENRY ROBINSON AND CO. (LEVENSHULME), LTD. Wholesale, retail and manufacturing chemists and druggists, oil and colourmen; manufacturers of and dealers in pharmaceutical, chemical, industrial and other preparations, soaps, etc. Nominal capital, £2,000 in £1 shares. Solicitors: W. Dutton, 64, Carlton Road, Sale.

R. SMALLEY AND CO. (1923), LTD., Bowker's Row, Bolton. Tallow and candle manufacturers and soap merchants. Nominal capital, £10,000 in £1 shares.

Liquidation of Sapon Soaps, Ltd.

THE statutory meetings of the creditors and of the shareholders in the compulsory liquidation of Sapon Soaps, Ltd., Wharf Road, Cubitt Town, E., were held on June 14 at Bankruptcy Buildings, Carey Street, W.C., Mr. G. Digby Pepys, Official Receiver, presiding. The winding up order was made on November 21 last on the petition of V. C. North and Co., chemical merchants, Finsbury Pavement, E.C.

The company was registered on September 7, 1917, with a nominal capital of £200,000 divided into 100,000 7 per cent. cumulative participating shares of £1 each and 500,000 shares of 4s. each. It was afterwards increased to £300,000. The company was formed to carry on the business of manufacturers of a cereal soap called "Sapon" under a certain patent process and to enter into an agreement with a company called Sapon, Ltd., for its acquisition, together with the trade marks and assets of the old company. In the autumn of 1921 the company brought out a new insecticide soap called "Derbac," and in October of that year it was resolved by the directors to create debentures to the amount of £100,000, of which £60,000 were to be issued, but negotiations with regard to their placing did not appear to have been very satisfactory, with the result that the directors decided not to proceed with the issue. With regard to the causes of the failure and insolvency of the company, various accounts were given by those who were best able to judge. The late chairman and the late secretary attributed the failure to bad management by the managing director, the secretary adding that in his opinion the immediate cause of the insolvency was the crippling of the company's resources by the investments in the New York and Canadian companies and the large capitalised expenditure on advertising and the inflation of the assets on the company's promotion. The chairman added that the failure was partly due to the difficulty experienced in obtaining raw material for the purposes of the company's manufactures. On the other hand, Mr. Macpherson asserted that the company's present position was due to its not having sufficient capital to complete the exploitation of "Derbac."

The chairman said that the whole of the assets were absorbed in the part payment of loans on debentures and of preferential claims. With reference to the shareholders a total deficiency of £347,772 was disclosed. It was clear from the figures that he had given, said the chairman in conclusion, that there was nothing for the unsecured creditors, and of course there could be no return to the shareholders. There could be nothing for a liquidator to do and certainly no assets out of which he could be remunerated—which was equally important—but if the meetings wished to appoint a liquidator they were at liberty to do so. It was decided to leave the liquidation in the hands of the Official Receiver.